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THE WORLD'S LEADING R/C CAR MAGAZINE

December 1998



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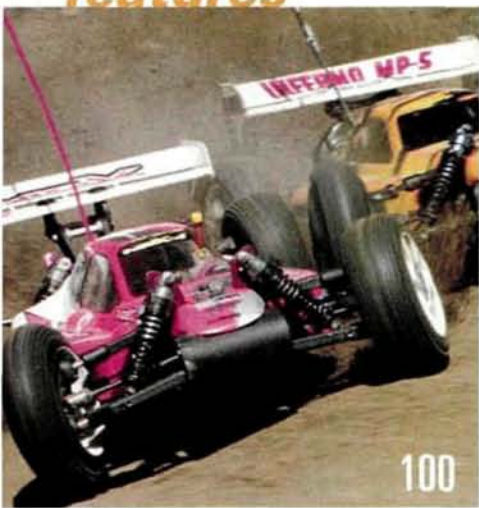
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The Formula 1 of Dirt Racing

These are the baddest R/C vehicles on the planet, at least in my opinion: 1/8-scale nitro racing buggies. Yeah, monster trucks are cool, but they're also electric; I need noise. Eighth-scale on-roaders are ballistic, but there's no roost factor. When it comes to hardcore R/C action, no vehicle compares to the dirt-slinging power



and white-knuckle speeds that are combined in the big buggies. Taming eight of these man-made monsters of mechanical malevolence for our **1/8-Scale Nitro Buggy Guide** was quite an under-

taking. But hey, we're willing to sacrifice a few days in the office to run a bunch of 1/8-scale buggies so you can have a killer article. Yep; it's all about sacrifice. As a companion piece, don't miss the comprehensive **.21 Buggy Engine Guide**. When you've finished these two features, you'll be a gas-buggy guru!



For a different breed of racing machines and racing action, check out Steve Pond's look at the **ROAR Off-Road Modified Nats**. Of course, Steve covered the on-track action, but he also made off with the winning cars from all three classes! Rest assured that Steve has dissected them thoroughly for your reading pleasure—and, hopefully, a faster run next Sunday!

Other hot spots this month include a new, not-to-be-missed **Homebuilt Project** entry in the form of a beautiful 1/4-scale '30 Ford—complete with a custom V8-powered boat on an equally trick trailer! Some guys have all the toys.



And of course, there's more: how to's, "Thrash Tests," product reviews, race coverage If it's R/C cars, it's in *R/C Car Action*. But you knew that!

Peter Vieira

Peter Vieira
Editor

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It's all in the Throttle

I have been reading your magazine for about a year now and enjoy it very much. I recently got into racing, and I have a Traxxas Nitro Rustler that I love to race. The only problem is when I go off a jump, my car nose-dives and usually rolls. I thought about adding weight to the back, but that would slow it down. How can I stop my car nose-diving without adding any weight?

SCOTT McDANIEL
Greensboro, NC

Are you letting off the gas or tapping the brake once your truck is airborne? Either can cause the truck to drop its nose. The mass of



the rear wheels has a profound effect on any R/C vehicle once in the air. If you stand on the gas, the rear of the car will drop, and that sets the car up to land rear wheels first. As noted above, the opposite happens if you lock up the brakes in midair. On really big jumps, drivers might get on and off the throttle more than once to set up for a perfect touchdown. Experiment with your driving technique!

—Pete

British Invasion

This message comes all the way from England, and it may seem a strange one. I have decided to get a Tamiya TA03 David Jun, all-singing, all-dancing chassis. Yes, it's my first car; NO, I won't change my mind, but I need to ask you whether it is OK to use

1700mAh batteries, a Tekin Rebel speed control and a mild modified motor instead of going all the way with a Novak Cyclone, 2000s and a Trinity GT1 motor. I will only be practicing in the parking lot and bashing with my mates, but I do want to keep the quality that comes with the David Jun. Your experience and thoughts would be greatly appreciated. Just in case it isn't obvious, I will be buying my equipment from the superior USA. Cheers. [email] JAMES

Superior USA? Jim, where's your patriotic pride? After all, you Brits brought us Monty Python, the Beatles and Lotus cars. Then again, you also dumped the Spice Girls on us.

You definitely do NOT have to get a Cyclone, matched packs, hand-wound motor, etc., to have fun (and go fast) with your DJ; the gear you listed will work just fine. (However, if you plan to race, you should stick with a forward-only ESC.) You hinted that I might knock the Dave Jun TA03 as a "first car," but I think you've made a great choice. It's an easy-to-assemble Tamiya kit—which will get you rolling quickly and easily—yet the car has all the performance you could ask for, so you won't need to upgrade anytime soon.

—Pete

Break out the Hard Hats

Hey! Great magazine! Thanks for helping me through the endless lists of cars, motors, tires and other pieces and parts for R/C cars. I finally decided to buy the Traxxas Nitro Stampede. I am still saving up and trying to prepare for it. I heard from a friend that you ran an article about how to make an R/C car racetrack. I have a lot of land and would like to make a track for me and my friends. Can you republish the article, or at least tell me how to get a back issue? Thanks. [email] CURTIS MYERS

Curtis, we ran an off-road track-building article way back in the January 1995 issue, and we did a

parking-lot-track how-to in the October 1995 edition. To get a back issue, call subscriber services at (800) 877-5169, and they'll help you out. They are also the folks to call if you are changing your address or have any problems with your subscription. —Pete

Safety First

I used to race 1/8 scale and want to get back into it. I raced an OFNA Pirate M3 (almost modified up to an RS) with a JR Alpina PCM radio system. This radio, along with the R-756 PCM system, had a fail-safe feature that acted like an insurance policy. If the receiver suffered any interference at all, the car would stop and go to idle. I read all the time about guys' cars going out of control and hitting full force into walls and curbs and being trashed. I don't know what caused their cars to go out of control, but chances are, if they'd had a fail-safe radio, it probably wouldn't have happened. The newer radio systems don't seem to have this feature. Was JR the only one to have it and, if so, why didn't they continue to make the Alpina and the R-756? I've seen it work plenty of times at the track and in my backyard. It's a good system to have, and I recommend it for every racer who has to keep a strict balance in his bank account. Thanks for the cool mag.

CHAD FROMME
Virginia Beach, VA

We're all for fail-safe radios with gas cars, Chad, but that option is available only with pricier PCM radios; currently, you have to pony up for a Futaba 3PJ or JR R-1 to get the feature. For most new nitro hobbyists, the expense of vehicle and engine leaves little cash for a top-end radio system. A fail-safe is nice, but common sense goes a long way, too. You should never have a runaway car if the transmitter and receiver batteries are charged and if you keep your vehicle reasonably close and carefully watch for frequency conflicts when racing or playing with others. —Chris

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

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Steve Pond: stevep@airage.com
Peter Vieira: peter@airage.com
Greg Vogel: gregv@airage.com

Buggy or Truck?

First of all, your mag rules! Second, HELP ME! I don't know whether to get a T3 or a B3. My friend across the street just got a B3. I think it is so cool!! I haven't seen the T3 in action yet. Do you know which would have more agility? I ask because I'm not sure if I want to start out with a buggy or a stadium truck. DREW STURM
Snohomish, WA

Racing buggies like the B3 have an advantage in acceleration and cornering, but racing trucks like the T3 handle rough terrain and big jumps better. If you plan to race, check out which class is more popular; it's no fun when only three guys show up to race in your class each weekend. And if you're not worried about racing, rough terrain, or big jumps, I'll offer this: I think buggies look cooler.

—Pete

Hey guys, great mag. I really liked the 4WD buggy shootout you did (October 1998), but I was wondering why Pete looks so mad in that shot of you guys on the drivers' stand. [email] Stan "The Man" Tarazewski

As I recall, we were lapping Pete. —Steve

Actually, I think I was hacking Pete at the time. As I was lapping him. —Greg

I wasn't there, but if I had been, I would have been lapping Pete. —George

Laugh it up. I'm still faster than Chianelli. —Pete



BY CHRIS CHIANELLI

EXCLUSIVE! TOP C12 engine

It's available in the U.S. from Savon Hobbies, and given the tremendous popularity of .12 racing here, the TOP C12 engine (made by NovaRossi) might be the most significant development in engine technology to date. Our exclusive look at the C12 reveals the cutting-edge technology and precision manufacturing for which this Italian manufacturer is well known.

This early production version of the C12 features a prototype 5.5mm slide carb. It resembles the carbs that now dominate $\frac{1}{8}$ racing because of their crisp, low-end response. Most kits were designed to use the rotary-barrel carb, so NovaRossi is apparently considering the production of a rotary carb to make the engine suitable for more applications. We hope that the slide carb will still be available even if NovaRossi decides to go with the rotary-barrel carb for the production units.

The C12's cylinder head also borrows some technology from the more advanced 3.5cc engines. It has a two-piece design that separates the combustion chamber and the cooling fins. Among other things, this allows users to experiment with combustion-chamber configuration, and if they ever need to, they'll be able to replace this vital part of the head without having to buy an entire head.

Instead of the more widely used 2.6mm bolts, 3mm bolts fasten the head to the block. The larger diameter makes the bolts stronger, so they're less likely to snap when you remove the cylinder head.

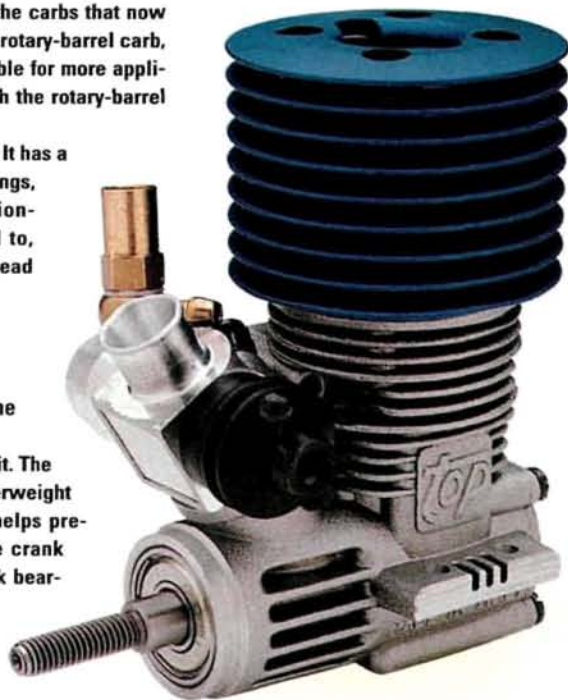
The C12's most significant features are inside it. The crankshaft takes advantage of a disk-type counterweight design that reduces crankcase turbulence and helps prevent the fuel mixture from blowing through the crank bearings. Tightly fitting, ultra-precise NMB crank bearings help with this.

The connecting rod is a work of art that should be hanging on a wall rather than being cooped up inside an engine. Both sides of it have a knife edge to reduce windage, and it's polished to a mirror-like finish to further reduce turbulence. The inside of the engine is finished off with a precision-fit piston/sleeve combo. The finely finished sleeve features true ABC technology that further enhances performance and durability.

The engine block has features never before seen in a .12 engine. The transfer ports that deliver fuel from the crankcase to the cylinder are massive! They perfectly match the ports in the sleeve, and that should ensure maximum air/fuel delivery and maximum horsepower. The rear cap on the crankcase features an O-ring seal that is more durable than the gasket seal used on most engines. It should allow the rear cap to be removed many more times without the seal's failing. Finally, the engine-mounting holes are identical to those on all the current .12 engines.

Though we haven't yet had a chance to run the TOP C12, it has all the right ingredients to make it a dominant powerplant in $\frac{1}{10}$ nitro-powered racing. It certainly has the most precisely fitted parts, which are the very best we've ever seen in a .12 mill.

Savon Hobbies, P.O. Box 421220, Miami, FL 33242-1220; (305) 634-8959; fax (305) 634-3950; website: www.savonhobbies.com.



Fast to the last drop

Trinity Formula 2000 commutator drops

This is Trinity's latest incarnation of its Formula 96 comm drops. Trinity developed Formula 2000 in the field, and over the past year, its race team proved the product to be the longest lasting, best comm drops for today's high-power stock and modified motors.

Use a drop of Formula 2000 on each motor brush when breaking them in. It helps keep the comm clean, helps brushes wear in quicker and protects the comm from scoring and pitting. It also keeps the comm lubricated during motor break-in. Before you race, use a drop on each brush for increased performance and longer comm life. Formula 2000 (product no. 2006) costs \$5.99.

Trinity Products Inc., 36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; fax (732) 635-1640; website: www.teamtrinity.com.





MORE MODEL MUSCLE FROM JR RACING

JR Racing has added new servos to its revamped line of linkage-yankers. The new models include the Z4750 Ultra Race, Z3550 Mini Race, Z2750 Super Race, Z550 Premium Race and Z250 Standard Race servos shown here. All except the Standard model are bearing equipped, and the specs look good; Look, I even made a chart for you guys who are easily confused.

MODEL	TORQUE (OZ.-IN.)*	TRANSIT TIME (SEC.)*
Z4750	96	.12
Z3550	38	.11
Z2750	60	.09
Z550	62	.17
Z250	49	.19

*Manufacturer specs at 6 volts

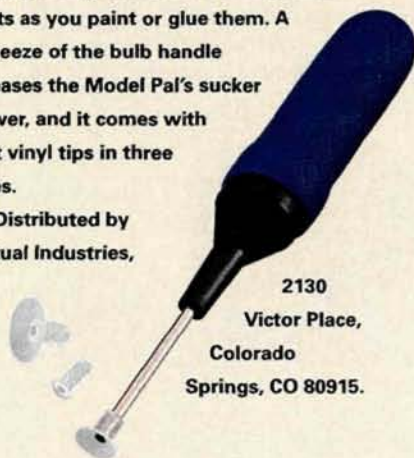
Distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; fax (217) 352-0355; website: www.horizonhobby.com.

Ya gotta have a pal

... Model Pal, that is. At first glance, this little widget appears to peg the goofy meter, but shut my mouth if it doesn't keep coming in handy! It's great for handling diff rings, placing decals and holding small parts as you paint or glue them. A squeeze of the bulb handle releases the Model Pal's sucker power, and it comes with soft vinyl tips in three sizes.

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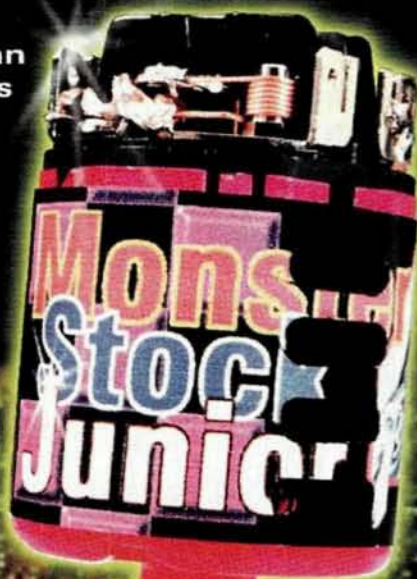
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Innoventive Technologies CVEC Tuned Pipe

PIPE DREAM Here's the latest in tuned-pipe technology: the next generation of CVEC adjustable tuned pipes for R/C nitro engines. The group includes the HS 125 (shown here) for $\frac{1}{8}$ vehicles and the HS 110 for $\frac{1}{10}$ vehicles. Each pipe is now purpose-built for the various engine sizes used in each vehicle class. The result is a longer taper in the convergence tube, and that means greater high-rpm horsepower. A gasket seal between the convergence tube and exhaust tube seals the system. Both pipes feature longer dual exhaust tips with smaller diame-



ters; this reduces exhaust noise, and dirt doesn't get packed into the tip when you run off-road. To further improve performance, the internal, variable-backpressure valve has also been modified to allow a greater exhaust flow at lower engine speeds. For $\frac{1}{8}$ scale, ask for part no. HS 125, and for $\frac{1}{10}$ you'll need HS 110.

Innoventive Technologies, 16025 23 Mile Rd., Macomb Twp., MI 48242; (810) 677-2310; fax (810) 677-2312; website: <http://www.innoventive.com>.



Get Hammadified!

Hammad Ghuman has some hot new gear for you off-road racers. These new alloy front uprights for Associated's RC10B3/T3 offer two kingpin mounting options for wheelbase adjustment, and the beautifully finished spring clamps and spring collars are offered for both Losi and Associated shocks. Shock mounts are available for both brands—all precision-machined from top-quality billet aluminum.

I saved my favorite pieces for last: the dumbbell-shaped rear arm mounts for Associated's B2/3 and T2/3 look killer and are available in 0-, 1.5- and 3-degree versions.

Hammad Ghuman, 6 Tower Heights, Albany, NY 12211; (518) 458-8441; fax (518) 458-2712.

U.S.

INDOOR

Championships



Nine Times Joel "Magic" Johnson has been crowned the **U.S. 4 Cell Indoor Champion**. No other driver has been able to win the title more than twice. In fact it would take the next six winners totals just to equal Joel's domination of this event.

The **D3** modified motors, **VIS EX-TRA** Sanyo RC-2000 battery packs and **Switch Blade 12sj** that helped Joel win his 9th title can help you win your first!

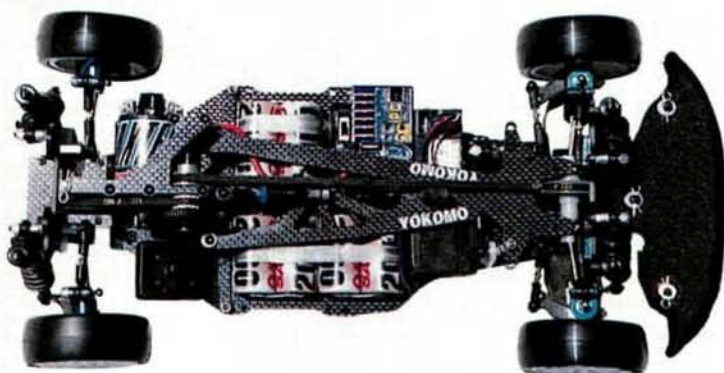


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www.teamtrinity.com

TRINITY

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Worlds ride!



Yokomo YR4-M2 Pro

Lotsa new stuff here, Yoke fans! The YR4-M2 Pro features a narrower carbon-fiber chassis that allows the cells to be mounted in a 3x3 or 4x2 configuration, and the cells are now closer to the chassis centerline to improve weight distribution. The top plate is also noticeably narrower and features a rear-mounted coil spring that allows traction to be subtly increased or decreased simply by adjusting the spring's tension; this is the same race-proven system as is used on the MX-4 4WD off-road buggy.

The Pro will include a machined-aluminum motor mount and 2-degree front bulkhead, hardened universal drive shafts and hinge pins, black hex screws throughout, full bearings, hard-anodized shocks and a really trick transponder mount that uses the transponder's weight to offset the weight of the motor. The car will also include 8-spoke wheels with 24mm-wide, firm-compound Sprint tires and firm foam inserts. No prices or part numbers were available at press time, but the car should be available once this issue is in your hands.

Yokomo USA, Airport Business Center, 17951 Skypark Cir., Ste. K, Irvine, CA 92614; (714) 252-8663; fax (714) 252-8657; website: www.yokomousa.com.



Two new kits from Tamiya!

Limited-production TA03R

Tamiya will soon release an all-in-one-box, hopped-up TA03R. The kit will include chassis and suspension components molded in black, sealed ball bearings, belted slick tires in Tamiya's sticky type A compound and a Mobile 1 Honda NSX body to top it all off.

Tamiya America Inc., 2 Orion, Aliso Viejo, CA 92656-4200; (800) TAMIYA-A; fax (714) 362-2250; www.tamiya.com.



TG-10 1/10-scale glowpowered touring car

OK; I goofed up once before when I referred to Tamiya's TGX as a 1/10 car, but this time, it's for real: Tamiya has created an all-new 1/10, 4WD nitro car. The new car is 192mm wide and can be widened to 200mm with optional offset wheels. If the number of calls Tamiya had from readers looking for info after my "false alarm" is any indication, this car should be a hit!



CHECK OUT ITS FEATURES

- double-deck chassis design with 2.5mm-thick sub-chassis, molded upper deck and performance-optimized weight distribution;
- chassis that accommodates the O.S. 12 LD engine (with slight modification) and Futaba's Block System electronics, or you can use a conventional engine and regular electronics;
- shaft-driven 4WD system with in-line engine mounting;
- independent front and rear suspension with adjustable camber;
- fiber-composite disk brake;
- oil-filled, coil-over shocks;
- front and rear swaybar mounts;
- rugged front bumper.

The engine, tuned pipe and other performance hop-ups shown here are not included, but rest assured, you'll be able to get them separately. Tamiya America Inc., 2 Orion, Aliso Viejo, CA 92656-4200; (800) TAMIYA-A; fax (714) 362-2250; www.tamiya.com.

PEAK PERFORMANCE LAUNCHES TEAM HOMIES



World-class racer Derek Furutani is heading up Peak's new Team Homies division and is set to release the first batch of Homie hardware for Associated and Losi buggies and trucks, and more gear will follow. Shown are lightweight motor plates for Associated (also available in "standard" styles without custom machining) and front bulkhead and rear transmission braces for Losi XX series 2WD vehicles. Team Homies also offers anodized front kick-up plates and rear chassis plates for Associated, and standard and lightweight motor plates for Losi (not shown).

Peak Performance: 23352-J Madero Rd., Mission Viejo, CA 92691; (949) 707-4683; fax (949) 707-4864.

READERS'

rides

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the eighth annual "Readers' Rides of the Year Contest" in the fall of 1998. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!



Gold Medalist

This Special Edition Goodwrench

Chevrolet that honors the '96 Summer Olympic games in Atlanta was born in St. Joseph, MO. Robbie Sipes and Chad Lawhon, its creators, say all the decals were drawn on a computer, cut out with a Roland Stika Vinyl Cutter and applied to a Protoform Monte Carlo body. A Trinity Ruby motor and Tekin Rebel speed control turn the Pro-Line Speed Hawg tires. A Futaba Attack SR radio and Sanyo 1400SCR batteries are also part of this package. Nice work, Robbie and Chad; we hope you only use the body for show.



Abominable Snowmonster

This Tamiya Clodbuster has been transformed by Brandon Sweeney of L'Anse, MI. Under the Chevrolet Z71 body are a Parma chromed Hemi engine, twin Trinity Midnight motors, Novak 610 speed control and a Futaba S9301 servo. The monster also features a custom push bar, roll bar, nerf bars and rear bumper, and a homebuilt tilt hood. In addition, it has a Clodzilla III full race conversion with two gold shocks on each corner and short gold shocks that act as servo savers. This beast's master is a Futaba Jr. radio. Now Brandon, about that other "model"....

Devilish Design

This stylish Lamborghini Diablo VT comes out of Philadelphia, PA, via owner Eduard Bautista. Under the hood is a Trinity Topaz 11 Triple motor. It also features a Novak Racer EX ESC and a ball bearing set. A Futaba 2-stick radio directs the car. Sleek!



Radical Racer

This replica of Emerson Fittipaldi's Marlboro Penske Indy Car met up with the real thing when owner Martin Bach brought it to the Vancouver Indy race. Bach, a resident of Kamloops, British Columbia, Canada, said he operated his R/C car around the "real" Indy cars of Fittipaldi and Al Unser Jr. Toolin' around the pits gave him the opportunity to meet Fittipaldi. Bach reports he and Fittipaldi had the same complaint that day—the dusty conditions made it difficult to get any traction! The R/C car features a Novak ESC, Airtronics radio gear, full bearings and hand-wound motors. The paint is customized, along with the wing fins and "shark" fin.



Lookin' "Sharpe"

Mark Gresock of Niagara Falls, NY, built this tribute to Scott Sharpe's 1993 SCCA Trans-Am championship car. Topped off with a Protoform Camaro Trans-Am body, this Associated RC10 Dual Sport is powered by a Trinity Midnight motor and a Novak ESC. Mark drives his racer at a local HobbyTown in Buffalo, NY, in the 2-wheel-drive gearbox class. His plan is to "rule" the parking lot.

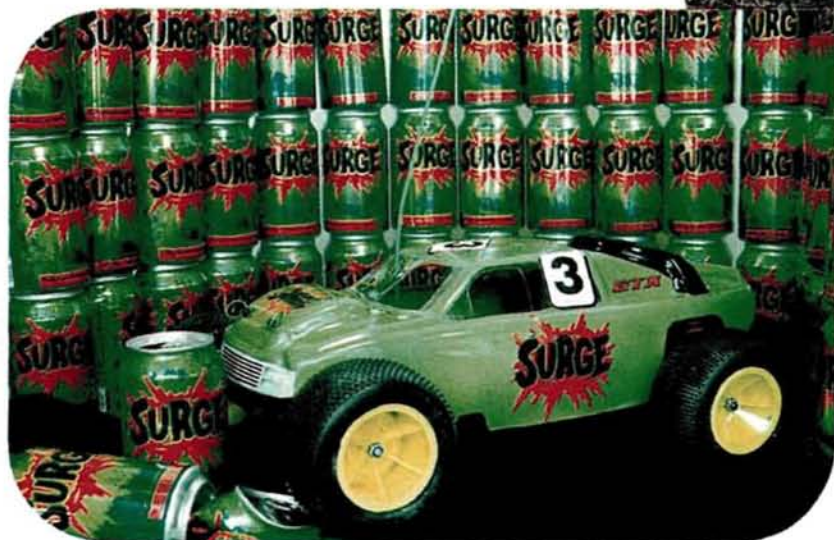


It's a Gas

Kyle Taylor of Camden, NY, loves his first nitro car: this Mugen Seiki Super Athlete. It has a NovaRossi (Top) BT21B .21 motor and a NovaRossi tuned pipe. He added a ball-bearing servo-saver and sealed ball bearings throughout the buggy. Kyle says three of his friends have the same car, and the four buds race weekly on their homemade track.

Big Bad Bunch

Dana Point, CA, residents Brett and Roberta Christner have an R/C car for every day of the week, and then some. Their collection includes OFNA's HODR and Blazer, Trinity's EV10, Tamiya's VW Beetle and Associated's RC10 T2, RC10 B2 and RC10 GT—two of each! All were upgraded with titanium and aluminum parts, modified motors and ESCs. Nitro cars are powered by O.S. engines, while all the vehicles feature Futaba electronics. The Christners are adding to this collection for their new son—passin' down their R/C passion.



Thirst for Fun

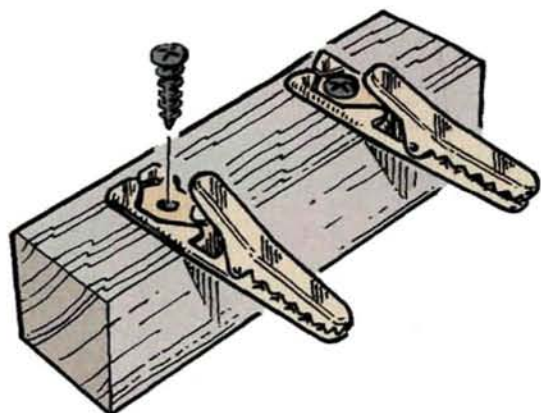
Michael Pannulla of Winter Springs, FL, sent us this shot of his Losi GTX truck. There's an O.S. CV engine under the hood, while an Airtronics M8 radio controls the stock Airtronics servos. Hmm ... we know what fuels Michael; we wonder what he uses to fuel his truck?

PIT

workshop ideas & innovations

BY JIM
NEWMAN

tips

**No-Hander**

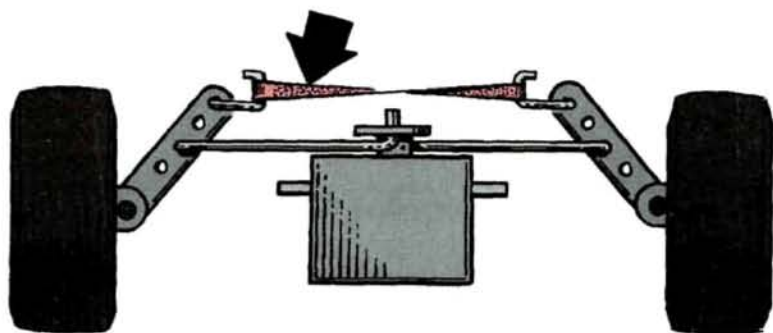
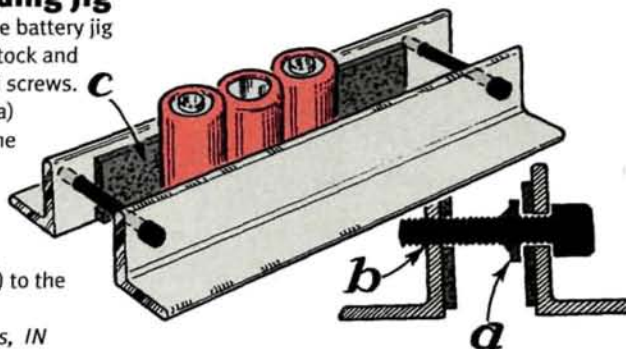
A pair of RadioShack clips screwed to a wooden block can be used to hold wire or other items while you solder. Sometimes it helps to position the block in a vise for a more comfortable working height.

MAT MORESCHI, Paris, IL

Battery Building Jig

Make this adjustable battery jig from plastic angle stock and a pair of Allen-head screws. Hot-glue a washer (a) into place to keep the screws captive, then tap a thread in the angles at (b), or use a nut. Finally, glue foam or cork (c) to the faces of the angles.

HAROLD KING, Kouts, IN

**One-Man Band**

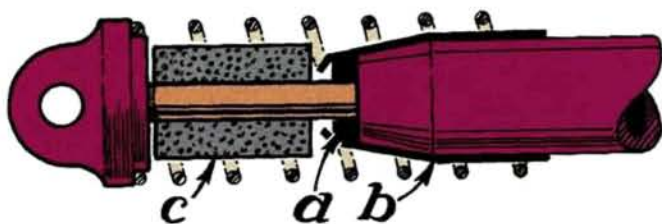
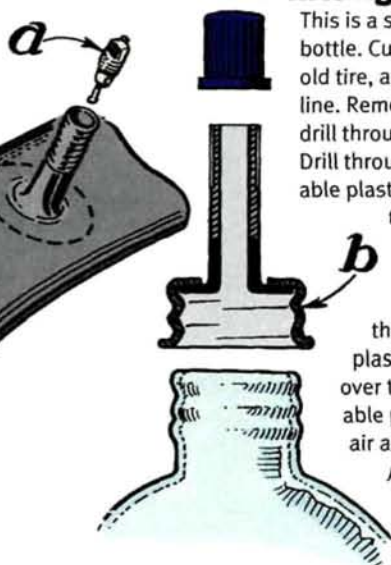
If wear in the steering bellcranks has made the steering "sloppy," hook a rubber band across them as shown. This will take up the slack until you are able to install new parts.

PAUL KOSTURA, Fountain Hills, AZ

Hitting the Bottle

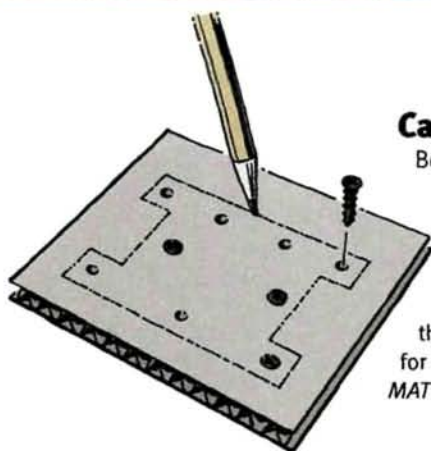
This is a simple way to make a fuel bottle. Cut the valve stem from an old tire, as shown by the dashed line. Remove the valve core (a) then drill through the stem to open it up. Drill through the cap (b) of a suitable plastic squeeze bottle, insert the valve stem from below, then screw the cap down tightly. You can use the original valve cap to seal the bottle, or you can push a plastic tube extension spout over the stem and use a suitable plug in the end to seal out air and moisture.

JOEL GOODMAN,
Gig Harbor, WA

**Shock-Shaft Wiper**

Dirt clinging to shock shafts will eventually scar the O-rings. While assembling the shock, slip a foam donut (a) onto the shaft, then place a piece of heat-shrink tubing (b) over the shock body. As the sleeve is heated, it will curl over the shock body and hold the foam donut. Use a paper hole puncher to make a hole through a foam earplug, then slip that onto the shock shaft as a dirt cover (c). The squishy earplugs do not affect the action of the shocks, and they really do work.

DAVE COWGER, Seattle, WA



Card Shark

Before you disassemble complex parts of your car, cut a piece of cardboard and on it draw the shape of the assembly you are working on. Pierce holes in the drawing to indicate the screw layout. As you remove the various screws, place them in the holes in the drawing as a guide for reassembly.

MATTHEW LAMBRECHT, Kerman, CA

Hole in One

If you crack a body shell during a race, just drill a $\frac{3}{32}$ -inch (2mm) hole at the end of the crack. This will stop the crack from spreading until you are able to get back to the shop and are able to make a repair.

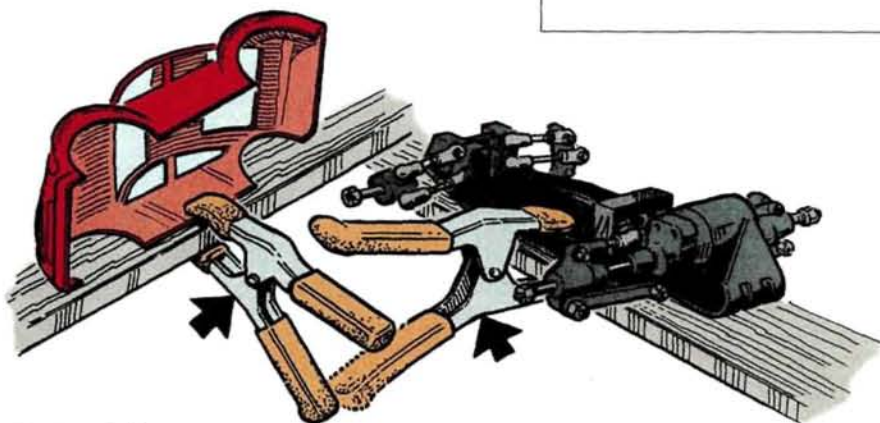
NILO VETTORAZZO, Rome, Italy



Have Cars will Travel

Small suitcases can make excellent car carriers. Line the cases with thick foam from the fabric store, then cut it to fit your car and its accessories. An electric bread knife is excellent for cutting the foam.

BERNIE ALBRECHT, Elmwood Park, NJ



Get a Grip

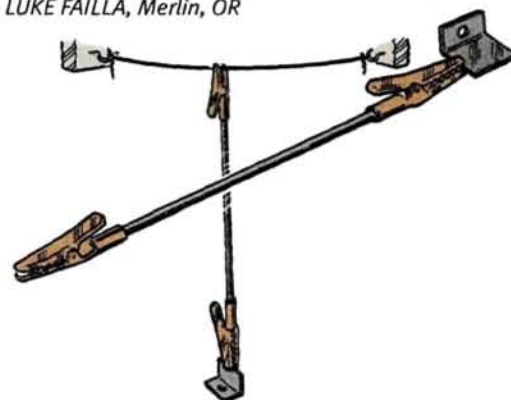
These plastic-coated spring clamps, available at hardware stores, can be used to hold body shells still for delicate work, or to secure the chassis to the bench during assembly.

JOHNNY NICHOLS, Black Hawk, CO

Little Gripper

This little device will hold small objects while you're painting them and will keep your fingers out of the paint spray. Turn it over and clip it to a cord while the paint dries. The tube or wire, soldered or glued between the clips, is about 8 inches (400mm) long.

LUKE FAILLA, Merlin, OR



If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to *Troubleshooting, Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

Flip the Switch

An article called "Drag Racing 101" (July '98 issue) made drag racing sound really cool, especially the part about single- and dual-microswitch power setups. The article didn't explain how they worked or tell how to wire them. How are the switches installed?

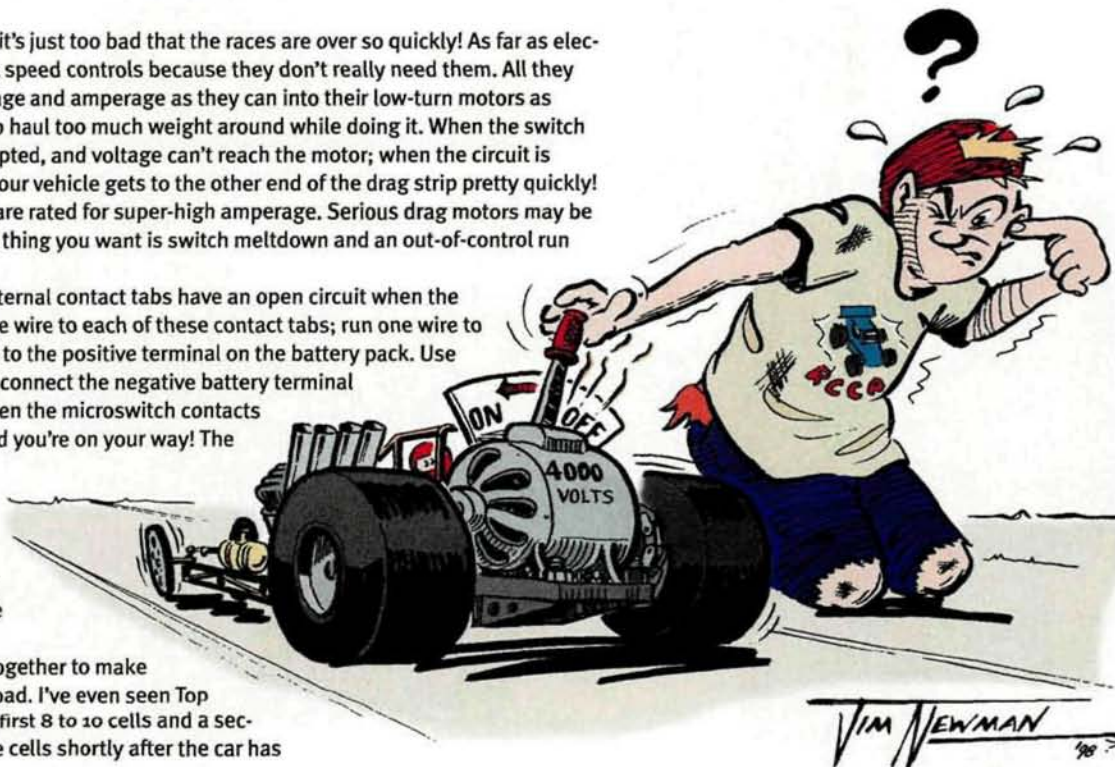
RODNEY FULKERSON
Cannelton, IN

I agree that drag racing is pretty neat; it's just too bad that the races are over so quickly! As far as electronics go, drag folks forego electronic speed controls because they don't really need them. All they really want to do is slam as much voltage and amperage as they can into their low-turn motors as quickly as possible—without having to haul too much weight around while doing it. When the switch contacts are open, the circuit is interrupted, and voltage can't reach the motor; when the circuit is "closed" by a servo's lever arm, well, your vehicle gets to the other end of the drag strip pretty quickly!

First, make sure that your switches are rated for super-high amperage. Serious drag motors may be pulling 100 amps or more, and the last thing you want is switch meltdown and an out-of-control run right off the end of the strip. Ouch!

Use a voltmeter to confirm which external contact tabs have an open circuit when the switch is open. Solder a 12- or 14-gauge wire to each of these contact tabs; run one wire to the motor's positive side and the other to the positive terminal on the battery pack. Use another length of heavy-gauge wire to connect the negative battery terminal and the negative side of the motor. When the microswitch contacts are closed, the circuit is completed, and you're on your way! The microswitch itself is activated by a microservo (torque isn't important); link a short lever arm to the switch lever with a Z-bend wire. You may also be able to mount the servo on the switch and eliminate the lever and wire altogether.

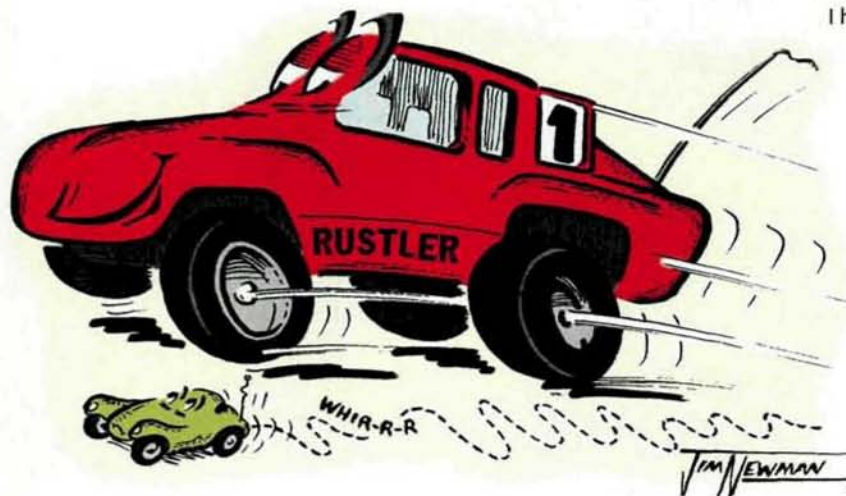
Some racers wire several switches together to make sure that they can handle the current load. I've even seen Top Fuel car setups with one switch for the first 8 to 10 cells and a second switch that activates the rest of the cells shortly after the car has launched.



Twitching Toy

I have a RadioShack car (I'm saving for a Traxxas Rustler), and when I turn it on and set it down, it moves forward slowly and shakes badly. When I accelerate, it stops and shakes even more. In reverse, it works fine (no shaking), but I can't drive it backward forever. Please help!

SHANE CARR
LaGrange IN



If there is no obvious mechanical problem such as a broken axle shaft, suspension arm, or hinge pin, the circuit board that controls forward motion is probably defective. Unlike the cars you build yourself, toy cars such as those from RadioShack usually have dedicated circuitry that must be repaired by a trained technician. Before you stick the car in the closet, check your repair options at the store where you bought the car. And good luck with saving for a Traxxas Rustler; I think you'll find that it will be easier to diagnose and repair.



Don't want no Toe

I have a Team Losi XX-4 four-wheel-drive buggy, and when I assembled it, I noticed what seemed to be a problem. When I compress the front suspension, the front wheels toe out. It seems that this is because the front tie rods are not parallel to the suspension arms. Will this affect the car's handling when it goes off large jumps? Is there a kit that will fix this problem?

PAUL TRAUGOTT
Temecula, CA

I've built and raced two XX4s and never had their wheels toe out when the suspension is compressed. If anything, at the very limit of suspension travel, there is very slight toe-in. Check that the front hub carriers have been installed properly: the left carrier on the left side and vice versa. Inadvertently swapping the hub carriers would cause toe-out bump-steer.



Time for Torque

I wrench for my brother John, who drives a Team Losi XXT Sport that has evolved into an XXT 'CR' Graphite Plus. We run a Futaba Magnum Junior radio with a Futaba receiver. Our problem is not enough steering, even with Losi directional front tires in the Silver compound. We used the recommended servo-saver setting and a Futaba S3003 servo but still broke servos! I upgraded to a Hitec 605 servo, took the nylon washer off the top of the servo-saver spring, loosened the servo-saver and added kingpin ball studs with three small washers on the steering spindles. Set up that way, the truck had trouble negotiating the tighter turns at our local indoor off-road track. If I replace the nylon washer and set the servo-saver back to the factory setting, the truck works great for about 10 laps, then the servo dies again.

So, with a loose servo-saver, the servo will last, but the truck won't turn. With a tighter servo-saver, the truck turns but the servos die. Any suggestions?

BROCK and JOHN NICHOLS
Black Hawk, CO

Guys, the servo on a fast racing truck has an unenviable task: to turn those big meats and keep them turned, no matter how many ruts, jumps, bumps, or other vehicles your truck is faced with. The Futaba S3003 servo you started with is a good choice for a lightweight buggy, a beginner car, or an on-road parking-lot tourer, but in a truck, it just won't last long out on the track. The Hitec* was a good upgrade choice, but I don't think that the Team Losi servo-saver properly fits the splines on the Hitec's output shaft. (Note: newer XXT kits include an additional servo horn to fit Hitec.) By the way: a slipping horn feels a lot like a broken servo. Check the horn first

If the servo really has had it, I suggest that you replace the servo-saver spacer. When you install the new servo, set the servo-saver assembly as loose as you can without its binding on the brace or making the steering sloppy.

*Addresses are listed alphabetically in the Index of Manufacturers on page 241. ■

Protect the holy seal

"Hey, Chris; my engine starts up and runs fine for a few seconds, and then it quits. What's up with that? Please help."

"Hey, Chris; my engine used to run great. Now it is so temperamental."

"Hey, Chris; lately, the needle setting on my engine has been very finicky. When I finally do get it running OK, I set it down on the track thinking I'm ready to rock 'n' roll, and it quits within the first lap or two. It never used to be like this. If you don't help, I'm going to smash the thing with a sledgehammer."

It's the piston/sleeve seal, guys!

I know, right now, some of you are thinking, "Oh, no—not that boring subject again. Forget that, Chris. Just tell me how to go faster!" It's true, I have touched on this subject before, but judging from the volume of email and snail mail I get on the subject, it's obvious that some of you clowns weren't listening! I can only assume that the subject needs a more lengthy treatment.

Before you can go faster, you first have to go. You have to get the car running and then keep it running without ruining it. So pay attention this time, 'cause I'm trying to help you.

One of the most annoying things about 2-stroke glow engines is that after the piston and sleeve seal—or "fit"—has worn out, they still run—well, sort of run. It would be so much simpler if the engines just refused to run at all with a worn-out

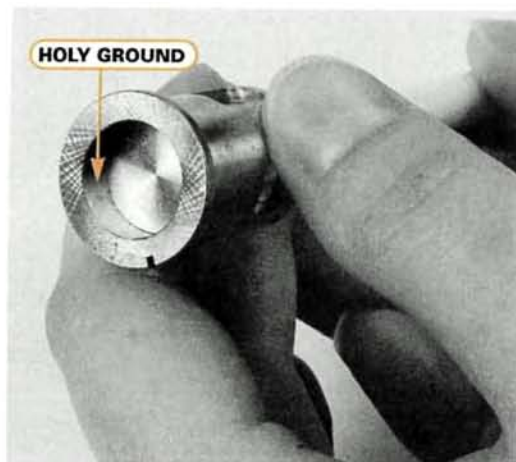
seal. But NOOOOOO! The tenacious little things have to keep on trying to run—albeit very badly—and giving us devoted R/C'ers a glimmer of hope. With the brand of blind faith only modelers have, we forge onward in search of the magic adjustment that has, thus far, eluded us.

But, of course, there is no magic to any of this. Probably the most sadistic trick these little gems pull on us is that they will often run perfectly for a

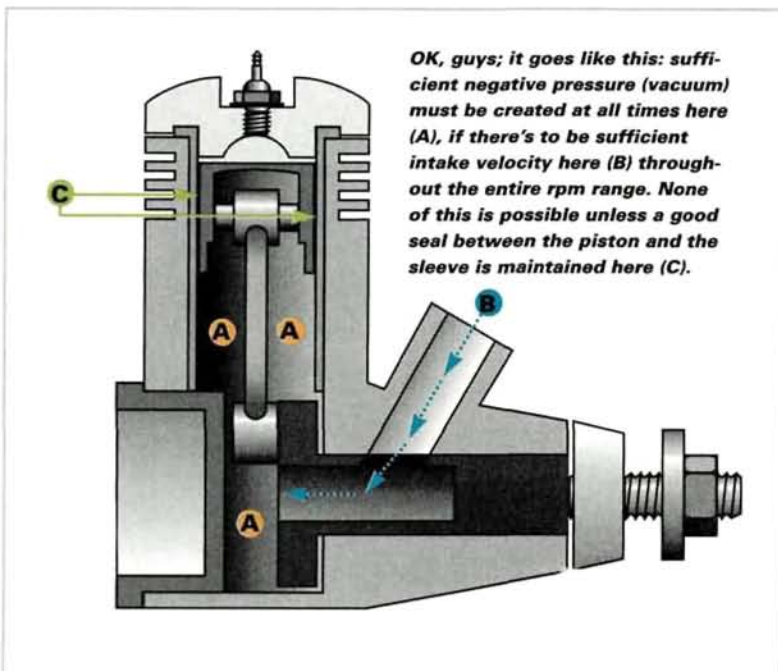
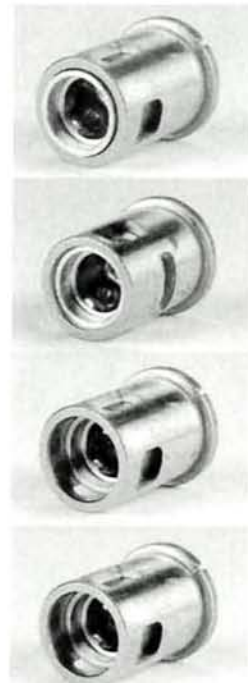
few moments on a cold start only to sputter and quit once they have reached running temperature. And there you have the answer: the secret lies in the hot and cold of it all.

If, at this very moment, you're thinking, "OK, he's being a lunatic this month. What the hell is he talking about!" please stay with me on this; it's so important.

Our engines incorporate an "ABC" piston and sleeve assembly. That simply means they have an aluminum piston running



In a way, the up-stroke is the most important thing in our 2-cycle engines. Why? Because without it, the power-producing down-stroke will never even happen. In this sequence, you can see how the bottom of the piston acts as a "plunger" on the up-stroke to suck in a fresh fuel/air charge. If there are any leaks in this "plunger," the needed vacuum at all rpm will be compromised, and performance will suffer, especially during quick acceleration from lower rpm. It's this simple: If you don't have a good piston/sleeve seal, you ain't got nuttin'!



OK, guys; it goes like this: sufficient negative pressure (vacuum) must be created at all times here (A), if there's to be sufficient intake velocity here (B) throughout the entire rpm range. None of this is possible unless a good seal between the piston and the sleeve is maintained here (C).

in a brass sleeve that is chrome plated. In some cases, nickel plating is used in place of chrome—but that's another "Piston Power." The piston is made of high-silicon aluminum while the sleeve is of brass (simply because chrome adheres to it well). Some R/C racing airplanes use engines with chrome-plated aluminum sleeves to save weight, but sticking chrome directly to aluminum is a complicated process and, again, that's

another "Piston Power."

When an engine is brand-new, the piston fit is tight—sometimes very tight—toward the top of the sleeve; the sleeve is tapered to make it so. The reason for this is easy to understand. Brass and aluminum have different expansion properties; the brass sleeve expands more than the aluminum piston. So, for the pair to have the correct fit at running temperature, they must be machined in such

So how do we protect that holy seal?

1. GOOD FUEL

Use only fuel containing 16 to 18 percent oil (lubricant). How can you be sure of the mix? Buy fuel whose manufacturer gives the oil percentage on the label.

2. MAINTENANCE

Don't leave any fuel in the engine (or in the tank, for that matter). Before putting your car away, put a few drops of After Run in the glow-plug hole and in the carburetor, and turn the engine over to distribute the oil throughout its "internals."

3. THE RIGHT EXHAUST

Toss out those horrid little expansion-chamber mufflers with those heat-producing, long extension tubes that often come with a kit, and replace them with a tuned pipe.

4. CHECK YOUR EGO

If your idiot buddy brags, "Ha-hah! My car is faster than yours in the straight-aways, dude," check his engine out. He has probably leaned out his mixture so much that the engine head is glowing red. He won't be fast for long. Leave him to his folly while leaving your high-end needle-valve set a bit rich, and tune that low-end needle for good throttle response. With positive response, you can dart through the turns with confidence. THAT'S where the race is won! And what of Mr. Moron who tweaked his engine out to the last possible rpm? Somewhere at mid-race, a track marshal was seen carrying his stalled car off the track with a pot holder.



Pacer's After Run oil.

a way that the sleeve has a tight fit around the piston when the metal is cold. If the piston and sleeve were machined for an easy push-through fit when cold, the fit would become way too loose once the engine had reached normal operating temperature.

Let's test your engine's piston/sleeve fit. Take the glow plug out and rotate the crankshaft. Even if the engine has been well broken in, there should be at least a little resistance as the piston approaches top dead center (TDC—the highest point reached by the piston) during rotation. If it goes through the stroke with no resistance at all, you're probably due for a new piston and sleeve assembly. Here's the final test: put a couple of drops of Pacer's* After Run Oil into the plug hole, and replace the plug. Turn the engine until you feel the piston squeeze the air in the cylinder, then hold it there. It should hold compression. If it doesn't, your

piston and sleeve have definitely gone south. If you can turn the crank so that the piston goes to TDC while the compression leaks out so quickly it offers little or no resistance, we can call you "the baker" because your engine is "well done." The engine may start, but it will never run properly again. Why? Because the piston function is not only for power on the downstroke, but it also acts as a suction plunger on the upstroke. This suction, or "negative crankcase pressure," as it's called, is your engine's fuel pump. When the piston and sleeve seal is compromised, the piston doesn't produce enough negative crankcase pressure (suction) to draw fuel past the carburetor's spray-bar at sufficient velocity and into the engine at all rpm to meet the engine's needs at all rpm levels. The engine may run, but it will do so very erratically.

*Addresses are listed alphabetically in the Index of Manufacturers on page 241. ■

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TL-01 Go-Fast Secrets!

During the summer of 1997, I had the good fortune to drive an early production version of Tamiya's*

then-new TL-01 chassis at a regional Tamiya Championship Series (TCS) race. Equipped with the kit tires and one of Tamiya's Dyna-Run 24-degree stock motors, the new entry-level platform was obviously capable of more than curb bashing. From the first turn, I knew that it would soon endear itself to newcomers—simple, well-mannered and user friendly.

A year later, I ran my own TL-01 in a 1998 regional TCS race, and I wasn't disappointed. The class had three full heats with competitors ranging in skill level from young drivers in their first racing season to grizzled veterans. As usual, close racing brought out that competitive spirit, and we all started to look for "secrets" that would help us expand the TL-01's performance envelope.

A CLOSER LOOK AT THE TL-01

I discovered that you don't have to spend a fortune to get truly competitive; my goal was to remain within the class rules and to keep everything as simple and inexpensive as I could.

I started with a stock TL-01 kit (in Alfa Romeo T-155 trim) modified to TCS specs: full bearings, oil shocks and a ROAR-legal stock motor in the engine bay. All other parts must be kit stock, although any Tamiya sedan shell is OK as long as the mounting posts fit through the predrilled holes in the body.

I took my time during assembly and made sure that all of the little plastic nubbins left over from the molding process were carefully removed from the parts. To improve drive-train efficiency, I rubbed a little Aero-Car* Gear and Diff Lube (the pink stuff) onto the gears when I assembled the transmissions.

The only construction snag came after I had assembled the chassis and gearboxes when I attempted to rotate the outdrives by hand. It was immediately obvious that there was some sort of interference between two of the gears, which would roll free and then hang up. I disassembled the gearboxes and discovered a small particle of trimmed nylon lodged between the inner main gear and the transfer gears. Once this had been removed, the drive train felt smooth and worked efficiently. Aside from that, everything was trouble-free. Thanks to its low parts count and excellent instruction manual, I completed the TL-01 in a single evening,



The TL01 is a solid, reliable car that is easy to build and requires little maintenance. It's fun out of the box and easy to upgrade with the hints and tricks outlined here.

• **Suspension.** Knowing that I had to use the kit-supplied shock springs made it easy to figure out what the final length of the shocks should be. That's because the kit springs are short enough to allow the insertion of three spacers under the shock piston without your having to worry about excessive spring preload once the shocks have been assembled. My object was to lower the chassis as much as possible without its scraping on the pavement. I have seen more than a few TL-01s rolling after encountering a corner dot, and I know

that you can't win when you're playing turtle! "Slamming" the tub also gave the wheels a little negative camber, which the TL-01 does not have at stock ride height.

Zero camber works great when you use the Mabuchi 540 motor that comes in the box, but things get a little tippy when you install a hot stocker. Adjustable upper links will also do the trick, but they're a no-no under TCS rules. For the latter half of the outdoor season, however, I raced at Hobby Works, where adjustable upper links and turnbuckle steering linkage are allowed for more tuning latitude.

• **Shocks.** Since the use of Tamiya's own color-coded springs was strictly forbidden, I experimented with shock-fluid and piston

combinations to suit my driving style. I tend to work the car into the entrance of a corner pretty hard; that means I need enough rear traction to prevent the back end from coming around and surprising me at the apex. I started out with 50WT oil and two-hole pistons all around, and although that did a pretty good job, the car seemed just a little "dead" to me. I had to turn the dual rate and steering travel down a bit to avoid oversteering in tight turns, and I wasn't really getting much feedback from the car.

After much experimentation, which resulted in a few empty bottles of shock fluid, I settled on 100WT in the front shocks with one-hole pistons and 40WT out back with two-hole pistons. This gave me the balance I wanted and resulted in a smooth, well-behaved corner carver. At the same time, the TL-01 was able to take a lick from another sedan without losing it entirely. In rough-and-tumble sedan racing, getting rubbed by another car isn't just a possibility; it's inevitable!



To lower the chassis by 10mm, three spacers were added to Tamiya's basic plastic-body shocks. This greatly improves the stability of the TL01 platform.



• **Tires** ... or "tars," as the good ole boys call 'em. I found that almost any Tamiya tire would work pretty well, but like anything in this hobby, there's always more performance out there for those who are willing to look for it. For instance, if fitted with hard, black, shaped inserts up front and soft, blue, shaped inserts in back, the kit sneakers do an acceptable job. Although highly recommended by other drivers, I tried but discarded the sponge liners that came with the kit because they just didn't support the sidewalls well enough

On any touring car, there is much to be gained by selecting the right tires. Tamiya's belted A- and B-compound slicks are excellent, and they're TCS-legal.

GO POWER

To maintain the TL-01's "spec" status, many local racing classes mandate the use of the kit's Mabuchi 540 motor. That's a good idea because even sport packs will get you through five minutes of racing before dumping, and in

testing, I was able to run consistently quick laps with the Mabuchi. (If you want to get the most out of your kit motor, refer to my article on tuning closed-endbell motors in the November '97 issue.) Eagle also manufactures an alternative TL-01 gear set that reduces

the gearbox reduction by 7 percent, and this results in a higher top speed with the Mabuchi motor. This gear set is imported by several firms, including California R/C*, and if your local rules allow you to make changes like this, you should definitely pick one up.

to make my car handle precisely when it got up to full speed. On the other hand, if you use the kit motor, they are acceptable.

I had better luck with M-grip slicks up front (also with the hard insert) and A-type reinforced slicks with a soft insert in back. This combo netted me fourth place in the local TCS race, and at that time, I thought the car ran really well. Although I had tried to run with A-types all around for increased steering, I wound up traction-rolling in the tight corners at the end of the long straights—hence my switch to the harder M-grips. The temperature was in the high 90s on the day of the race, and I noticed that drivers using other types of tires also had problems later in their heats when their tires got hot 'n' greasy.

After the regionals, I talked with some of the truly fast guys in the modified class and tried their hot setup: A-types all around with hard inserts up front and soft ones in the rear. This really did the trick, especially when paired with a steep-nose body like the Mercedes DTM. If you use a blunt-nose body such as a Skyline or Accord, however, I think you'll find this combination just a tad pushy, especially on cooler days.

On the other hand, it's easy to make the TL-01 much, much faster by using a stronger motor. The Tamiya Championship Series rules dictate the use of a ROAR stock-class 24-degree motor, and there are lots of good ones out there. I've seen folks use

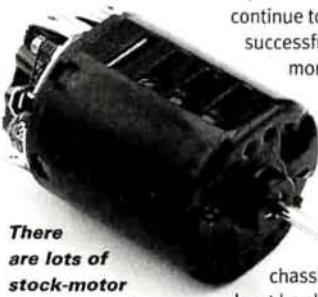
Trinity's* X-Star and Reedy's* Firehawk with great success, and I did quite well at the regional level with a fairly peppy Trinity Green Machine2. My best results came with a Trinity Midnight2 tuned by the rapid guys at Matrix* and paired with a 23-tooth pinion. This combination resulted in my fastest lap times, although it left even high-capacity 1700mAh battery

packs close to exhaustion at the end of a 5-minute heat. The speed down the front straight with this motor was almost too much, however, as the car's insufficient negative camber made things feel a little teetery toward the last 15 feet of the straight section. Even so, infield punch was enormous, and I found myself able to squirt from apex to apex without much loss of momentum.

WHAT'S NEXT?

Unfortunately, Tamiya didn't include a TL-01 Spec Sedan class at the U.S. Nationals in September. Since the local parking-lot series has Spec rules that limit motor selection and encourage entry-level racers, I'll be moving up to the Sedan Stock class. It will be interesting to see whether my underdog TL-01 will continue to compete

successfully against the more complex and sophisticated belt-driven Tamiya cars. Based on my experience with Tamiya's latest sedan chassis, I should at least be close!



There are lots of stock-motor choices out there, but I found that the Trinity Midnight2-based motors worked best in my TL01.

*Addresses are listed alphabetically in the Index of Manufacturers on page 241. ■

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1:5 Scale

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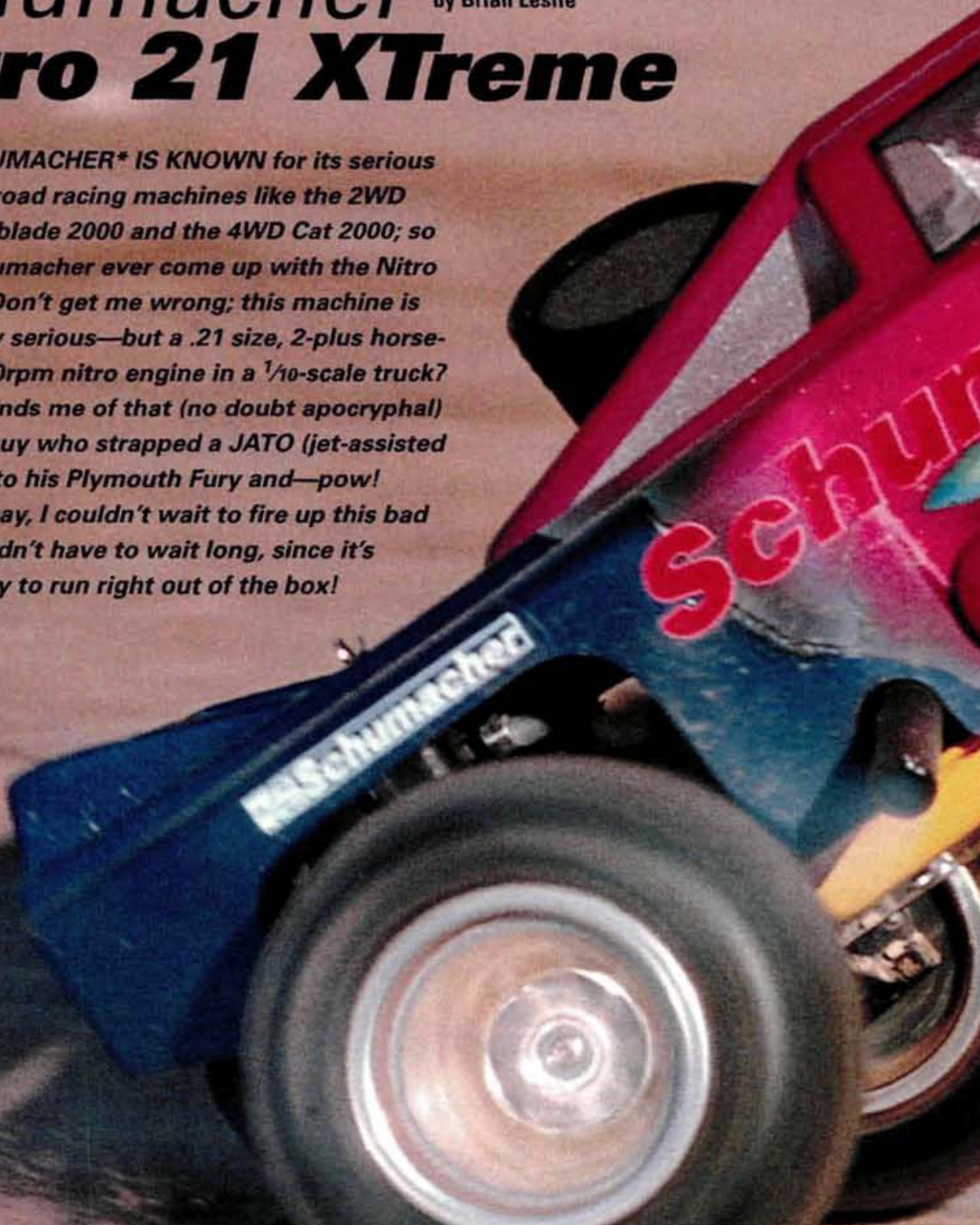


Schumacher

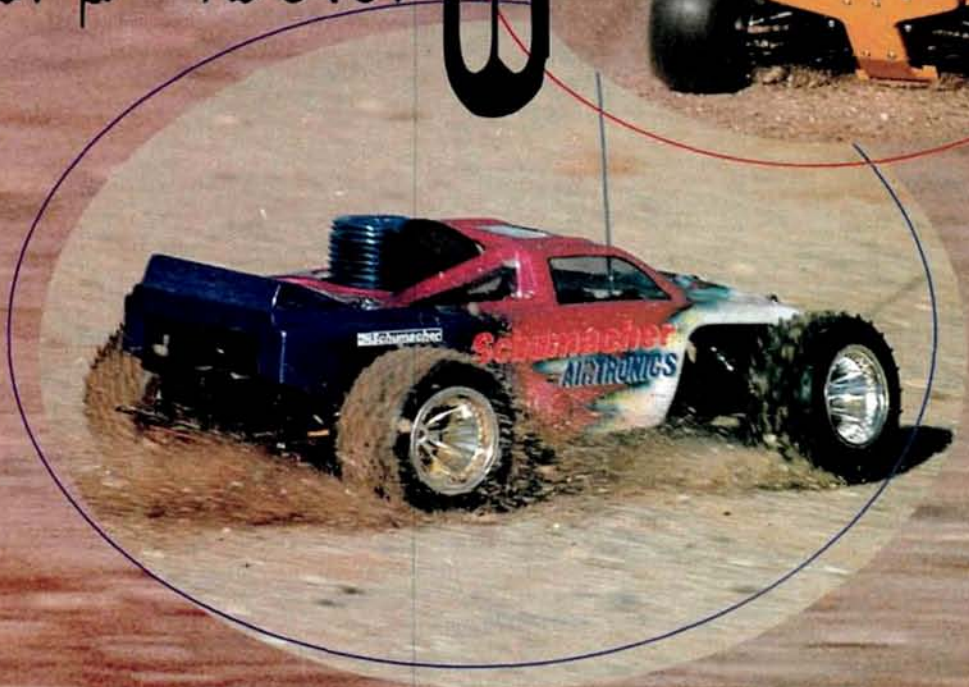
by Brian Leslie

Nitro 21 XTreme

SCHUMACHER* IS KNOWN for its serious off-road racing machines like the 2WD Fireblade 2000 and the 4WD Cat 2000; so how did Schumacher ever come up with the Nitro 21 XTreme? Don't get me wrong; this machine is serious—very serious—but a .21 size, 2-plus horsepower, 30,000rpm nitro engine in a 1/10-scale truck? Yikes! It reminds me of that (no doubt apocryphal) story of the guy who strapped a JATO (jet-assisted takeoff) unit to his Plymouth Fury and—pow! Needless to say, I couldn't wait to fire up this bad boy—and I didn't have to wait long, since it's virtually ready to run right out of the box!



Warp-factor 8



PHOTOS BY WALTER SIDAS

SCHUMACHER NITRO 21 XTREME



s p e c s

Scale 1/10
List Price \$319.50

DIMENSIONS

Wheelbase 10.6 in. (270mm)
Width (F/R) 12.2 in. (310mm)

WEIGHT

Gross, RTR 78.9 oz. (2248gm)

CHASSIS

Type Tub
Material Stamped steel

DRIVE TRAIN

Type Sealed belt drive
Primary Clutch bell/spur gear
Drive shafts Plastic telescoping universals
Differential(s) Ball
Clutch Centrifugal
Bearings/bushings Ball bearings

SUSPENSION (F/R)

Type Lower A-arm with molded upper link
Damping Oil-filled, coil-over shocks

WHEELS (F/R)

Type One-piece molded
Dimensions (DxW) 2.2x2 in.

TIRES

Front Schumacher Vee-2
Rear Schumacher mini spike

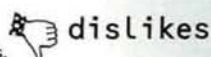
POWERPLANT

Engine Thunder Tiger Pro 21
Carb Slide type
Pipe Schumacher aluminum

- Pulls a wheelie at just about any speed.
- Unbelievably fast.
- Excellent engine.
- Did we mention it was fast?



- Weak servo-saver.
- Does not accept standard spur gears.
- Hard kit tires.



BODY, WHEELS AND TIRES

The XTreme's truck body definitely has a unique look, which I like. The kit includes window masking to help make painting easier and quicker. Schumacher also includes brightly colored decals to dress up the finished product. The plated wheels are standard 2.2-inch units for nearly limitless tire options, and stiffening ribs run from the axle hole to the outer edges of the wheel for extra strength. Mini pin-spikes adorn the rear wheels while a V-pattern tread with spikes takes care of the steering duties.

THUNDER TIGER PRO 21R ENGINE WITH PULL-START

Let's face it: the engine is the headliner here. The Pro 21R is equipped with a very rugged pull-start mechanism, a slide-valve carb so big I fear low-flying birds might get sucked in, a large blue-anodized aluminum heat sink, ball-bearing-supported crankshaft and a highly polished aluminum tuned exhaust with pressure fittings already installed. Very nice indeed. You could drop this mill in an 1/8-scale off-road machine and be competitive. An aluminum fly-wheel and a one-piece steel clutch bell/pinion gear are at the business end of the crankshaft.

PILE O' RADIO GEAR

The XTreme's layout calls for the steering servo, throttle servo and receiver to be stacked on the chassis—not the greatest thing for maintaining a low CG, but since there's already a big chunk of engine poking out of the truck, who cares? Note the spring that is provided to close the throttle, if something ever goes awry in the radio department.

FRONT SUSPENSION AND STEERING

Fiber-filled A-arms are attached to the front kick-up plate by steel hinge pins held in place with E-clips. The arms each have two shock-mounting holes that allow shock-sensitivity adjustments. High-volume plastic shocks absorb the big bumps, and spacers are used to adjust preload; hard-body aluminum shocks are an option. Schumacher's well-known adjustable pistons are supplied. The tops of the shocks are mounted on a thick, black fiberglass shock tower that is sandwiched between the kick-up plate and bellcrank assembly. One-piece, non-adjustable rods keep the camber and toe set; titanium units are optional. Ball joints make the suspension and steering feel very smooth and tight, and a two-piece bellcrank handles the steering. A servo-saver is supplied, but it feels very soft; a firmer unit from Kimbrough* is well worth the minimal expense.

FULL BEARINGS

With all those ponies under the hood, no bushing could last more than a few runs. Schumacher wisely supplies bearings for all rotating parts.

REAR SUSPENSION

Each lower A-arm is attached to the chassis with two small mounts rather than the traditional single unit found on most stadium racers. The mounts are sealed on both ends to hold the steel hinge pins in place. L-shaped pins made of curiously thin rod hold the large hub carriers in place at the ends of the A-arms, and fixed-length upper control arms keep camber set. Ball joints and ball cups attach the two large-volume shocks to the A-arms. The tops of the shocks are mounted on a black fiberglass rear shock tower that is sandwiched between the transmission case and the fully enclosed receiver battery-pack holder. Built to the kit

specs, the XTreme's damping is fairly firm—all the better to cope with the heavy engine.

FUEL TANK

An unusually shaped, 75cc fuel tank supplies the fire breather with fuel, but the Thunder Tiger engine looks as though it could empty the tank just getting fired up. The tank's smallest opening can lead to messy fill-ups if you aren't careful; so be careful.

STEEL(!) CHASSIS

Schumacher obviously felt that nothing but steel would do to contain the horsepower of a 21 "nuke plant." The chassis is made of a 0.0625-inch-thick stamped-steel plate (no flexing here!), powder-coated bright yellow; it definitely gets your attention. All underside chassis screws are countersunk so they won't snag the ground—not that this truck will spend much time on the ground.

TRANSMISSION

A two-pulley belt-drive unit takes the raw power from the nitro burner and delivers it via a very smooth ball diff to telescoping universal drive shafts. Pinion and spur gears can be changed to achieve more low end or top end. Believe me, the stock setup is more than adequate. An optional slipper-clutch unit can be purchased from Schumacher; I highly recommend this option if you plan to jump this truck. The slipper will relieve some of the load imposed by full-throttle landings, and this will lengthen the lives of your drive shafts and transmission.

A fiberglass disk brake actuated by a steel caliper slows the speedster down.

TEST GEAR

• Airtronics* 3PS FM radio and receiver • Airtronics 94151 steering and throttle servos • Blue Thunder* 20-percent-nitromethane fuel.

PERFORMANCE

The moment I had been waiting for since the truck arrived at last came! With great anticipation (and a little fear), I packed up my gear and headed to an open playground to put the Nitro 21 XTreme through its paces. The Thunder Tiger Pro 21 engine fired up quickly and idled well from the start. This engine is known to be user-friendly, and it didn't disappoint me. But before I could hammer on it, I broke it in with four tanks of fuel at a very rich setting. Then, slowly, I leaned the engine out just a tad by turning in the high-end needle valve (clockwise) $\frac{1}{8}$ of a turn. With so much power on tap, you don't have to run it on the lean side, and for proper break-in procedures, it is always best to follow the manufacturer's instructions. With the engine suitably broken in, I was ready to let the XTreme rip.

The XTreme requires slow and steady throttle application to get the power to the ground without spinning the wheels or lifting the front end. Even then, you should be prepared to make steering corrections when the Thunder Tiger powerplant reaches peak power. Once you have the XTreme wound out, its speed is, well,

YOU'LL NEED

- 2-channel radio.
- 2 servos (heavy-duty steering servo recommended).
- Fuel.
- Glow-plug igniter.
- Receiver battery pack.
- Charger (if using Ni-Cd receiver pack).
- Polycarbonate-compatible paint.

The Nitro 21 XTreme arrives almost ready to run; you need only to paint the body, glue the tires, and install the linkages for steering and throttle, and you're off. Keep the following in mind:

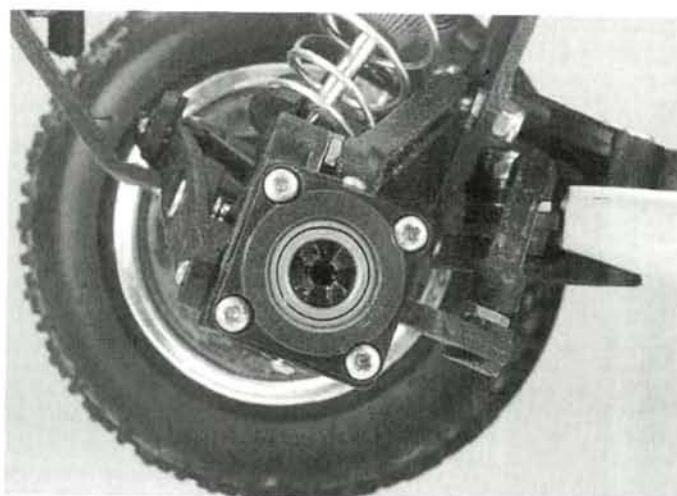
■ Make sure the linkages operate freely; the throttle should close automatically via the tension of the safety spring.

■ Not sure if the engine's ready to howl? Then it probably isn't. When in doubt, break it in longer. The Thunder Tiger Pro 21 requires at least four or five tankfuls of fuel before the ABC piston and sleeve are ready for leaned-out rock 'n' roll. Just follow the instructions, and you'll do fine.

■ Keep the steering and throttle inputs smooth. It's easy to get out of shape with this truck if you accelerate hard or cut the wheel at speed.

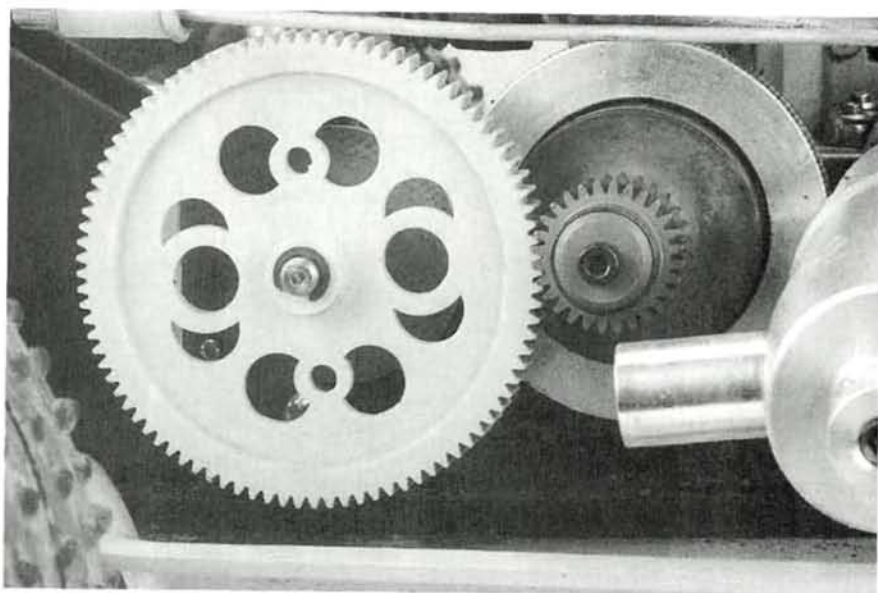
■ The XTreme can jump, but be careful; it doesn't have a boatload of suspension travel to cushion the heavy engine and chassis. More important, there's no slipper clutch to protect the tranny and drive-train parts if you touch down with the throttle on. Go easy.

BUILDING & SETUP TIPS



Left: where's the axle? The XTreme uses hub-mounted bearings and a unique, keyed boss to mount the wheels.

Below: I was warned that the power of the ThunderTiger .21 engine would strip the 48-pitch gears, but they held up great!



extreme. At full bongo, the truck passed through our speed trap at 48mph. That's stand-back, comin' through, going like (swear-word) fast.

At top speed, the XTreme eats up real estate (and radio range) in a hurry, so you'll need to either turn or get on the binders quickly. Neither option upsets the truck too much, but don't try to snap the truck left once the chassis has leaned over for a right turn (or vice versa), as it will roll over quicker than Joey Chitwood.

In the dirt, the XTreme can't really make good use of its horsepower: there's simply too much muscle (especially without a slipper). Imagine trying to pilot a 5-liter Mustang down the quartermile with only a pair of skinny spare tires mounted on the rear axle; you get the idea. For real fun, mount up some Pro-Line® Speed Hawg sneakers and tear around a parking lot; you'll have too much fun going much too fast.

FINAL THOUGHTS

Although the Nitro 21 XTreme doesn't dip into the cutting-edge end of the technology spectrum like Schumacher's CAT and Fireblade racers, it definitely pushes the envelope when it comes to power-to-weight ratio. If your idea of high performance can be summed up in three words—speed, speed, speed—then the Nitro 21 XTreme is for you. Even the most horsepower-added gearheads out there will take notice when this truck blasts by, and yet it is very easy to live with. The pull-start Thunder Tiger engine is as reliable and user-friendly as they come, and the XTreme is plenty durable as long as you don't overtax the tranny with power-on landings and drag-style launches when traction is high (oh, yeah; you shouldn't hit immobile objects, either).

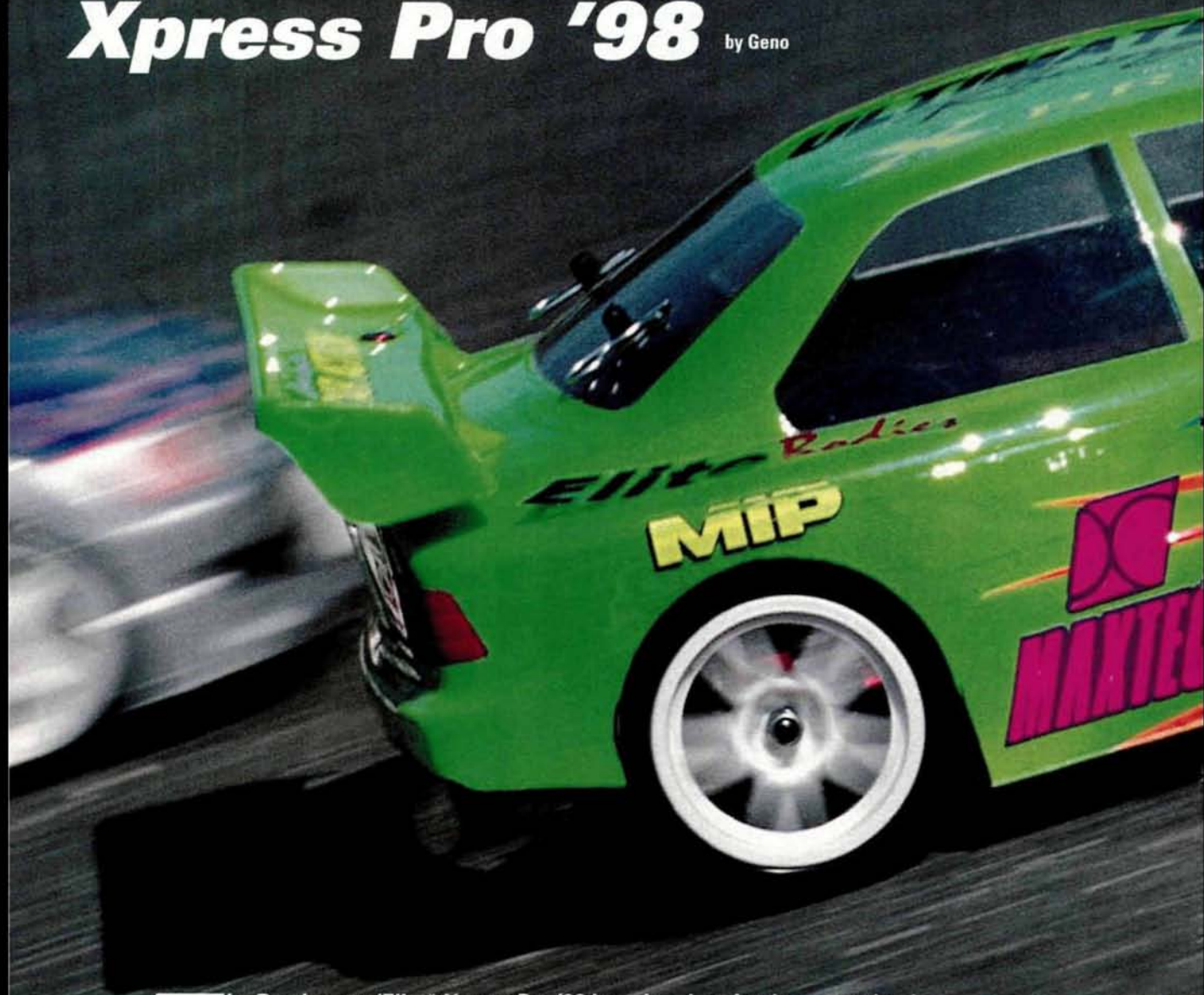
*Addresses are listed alphabetically in the Index of Manufacturers on page 241. ■

thrash
TEST

1/10 scale electric

Roadrunner/Elite Xpress Pro '98

by Geno



The Roadrunner/Elite* Xpress Pro '98 has already gained a reputation in Southern California for being a competent performer, and as a result, it isn't unusual to see the car's unmistakable red-anodized aluminum hardware monopolize the pit tables at Saturday night club races. Judging from the Xpress Pro's long list of unique racing features, its popularity isn't surprising. I had an ear-to-ear grin when our very own senior West Coast editor, George M. Gonzalez, gave me the opportunity to "thrash" on this new 4WD contender. Let the games begin!

PHOTOS BY WALTER SODAS



Express-train to Victory

s p e c s

SCALE 1/10
LIST PRICE \$450

DIMENSIONS
Length overall 13.94 in. (354mm)
Wheelbase 10.25 in. (260mm)
Width (F/R) 7.4 in. (188mm)

WEIGHT
Gross, RTR 48 oz. (1,361gm)

CHASSIS
Type Tri-level
Material Woven carbon fiber

DRIVE TRAIN
Type Direct-drive/
dual-belt 4WD
Primary Spur/pinion
Drive shaft Universal
Differential(s) Ball
Slipper clutch None
Bearings/bushings Bearings

SUSPENSION
Front Lower A-arm
w/adjustable upper
caster and camber links
Rear Lower A-arm
w/adjustable upper link
Damping Oil-filled, coil-over,
plastic-body shocks

WHEELS
Front GTR 5-spoke super-
narrow
Rear GTR 5-spoke mid-
narrow
Dimensions (DxW) 2x1 in. (52x26mm)

TIRES
Front/rear Non-directional treaded
radials with foam
inserts

ELECTRICS
Not included



DUAL-BELT 4WD

The dual-belt drive system is silky smooth and friction free. Out of the box, the front and rear drive belts had just the right tension and did not show any noticeable stretching after many torturous runs with ballistic modifieds. The included non-adjustable, bearing-equipped molded belt tensioner is basically just a servo post with a bearing attached. I replaced it with a red-anodized GM-Racing* servo post that matches the other red-anodized parts perfectly. That the entire drive system and all four wheels spin on high-quality bearings must also contribute to the drive train's silky feel.

UNIVERSAL BATTERY MOUNTING

The Xpress Pro accepts stick packs and saddle-packs and comes with a molded stick-pack harness (not shown) that allows battery access from either side of the chassis. I chose the saddle-pack configuration because it distributes battery weight much more evenly.

DIRECT-DRIVE STEERING

The direct-drive steering system has a center-point steering linkage. You provide the servo-saver (Kimbrough's* large-scale servo-saver is highly recommended). The steering rods are bolted directly to a vertically mounted servo, and an aluminum brace secures the top of the servo to the upper chassis plate. I used Shoe-Goo to hold the servo in place, and since Shoe-Goo dries like solid rock, I felt no need to use the upper servo brace.

FRONT SUSPENSION

The innovative front end incorporates three linkages on each side of the chassis. In addition to the usual steering and camber links, there are adjustable caster links that resemble torque rods and deliver infinite caster adjustment with a simple turn of the wrench. The front end is adorned with all sorts of red-anodized aluminum pieces that include the bulkhead, hub/steering knuckle and the caster links' end attachment rods.

LIGHTWEIGHT BALL DIFFS

The preassembled front and rear diffs are super smooth and didn't require any adjustment. The outdrives are all made of a lightweight plastic polymer that considerably reduces rotating mass. Unique plastic rings attached to the ends of the outdrives prevent the outdrives from expanding when under load.

REAR SUSPENSION

Unique aluminum-and-graphite rear hub carriers look trick and allow many outer camber-link mounting positions. The rear suspension arms are made of the same graphite polymer as the front arms. The front and rear shock towers are made of woven carbon fiber. The plastic-body oil-filled shocks feature aluminum caps and seals and are threaded to make spring-preload adjustment simple. The shocks also include double O-ring seals and rubber diaphragms, and if you bleed them carefully, they will work smoothly and precisely.

ALUMINUM REAR BULKHEAD/MOTOR PLATE

The red-anodized aluminum motor mount has been milled out to save every possible gram; it does an incredible job of dissipating motor heat and makes it easy to access the center-mounted layshaft and rear diff.

TRI-LEVEL CHASSIS

Two graphite upper deck plates span the distance between the front and rear bulkheads. Aluminum posts join the two upper plates at the middle of the chassis and also secure the upper plates to the thick, lower carbon-fiber chassis. When the plates have been bolted together, the chassis is super stiff, both side to side and front to back.

UNIVERSAL DRIVE SHAFTS

The kit includes Roadrunner/Elite's own type of constant-velocity drive shafts. They work very well, but to further reduce rotating mass, I eventually replaced them with a complete set of lightweight MIP* aluminum CVDs.

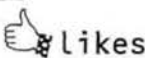
TIRES AND WHEELS

The Xpress Pro comes with 5-spoke GTR wheels (mid-narrow rears and super-narrow fronts) and a complete set of non-directional radial tires with foam inserts. The soft rubber tires work great on outdoor parking-lot tracks and are terrors on carpet!

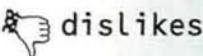
YOU'LL NEED

- High-quality 2-channel radio with receiver.
- High-speed steering servo.
- ESC.
- Motor.
- 6-cell battery.
- 190mm sedan body.
- Lexan paint.
- Du-Bro weighted tape (optional).
- Shoe-Goo to mount the servo properly.
- Kimbrough large-scale servo-saver.
- CA glue for the tires.
- Double-sided tape.
- Antenna tube and mount.

- Arrives 70-percent assembled.
- Easy to set chassis tweak.
- Lightweight diffs.
- Lightweight graphite hinge pins.



- No battery hold-downs for saddle-pack setup.
- No shock oil provided.
- Instructions could be clearer.



FACTORY OPTIONS

- Elite gear adapter (red aluminum)—part no. E9008.
- Elite metal antenna holder—E9005.
- Elite aluminum Teflon-coated racing shocks—E6000.
- One way shaft set—968-59.
- Velcro®-brand-fastener battery hold-down straps—968-97BL.
- Graphite 0.5- and 1-degree rear arm hub carrier—968-115.
- 3mm graphite main chassis—968-119.
- Aluminum-"ball" rear arm holder—968-127.
- Shock towers (3mm, F/R)—968-128/968-129.
- High-speed hardened hinge pins—968-131.

TEST GEAR

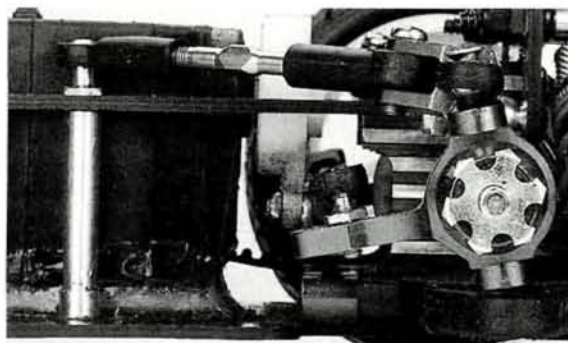
- Airtronics* 3PS Caliber radio • Novak* Mercury receiver • Airtronics 94157 steering servo • Novak Cyclone ESC • Maxtec V-Max RC2000 matched cells
- Maxtec ShockWave 11-turn single modified motor • Elite BMW sedan body custom-painted by Todd Amman • Yokomo Inch Up wheels, firm-compound Sprint Tires and firm-compound molded inserts • Yokomo battery-retaining trays.

PERFORMANCE

I chose my local on-road track, SoCal Raceway in Huntington Beach, CA, for the "thrash" portion of this test. The asphalt surface provides great traction, and there is plenty of room to open up those monster modifieds. The fun was there for the taking.

Having spent considerable time with Elite's Factory A-team drivers, I decided to

(Continued on page 182)



The Xpress Pro front end shown here is stock except for the titanium tie rods and Kawada* superior hubs. The red-anodized aluminum bulkhead and steering knuckles are expensive options on other cars. Caster, camber and toe-in/out are all adjustable.

BUILDING & SETUP TIPS

■ As with any high-quality graphite chassis plate, you should file the sharp edges of all the battery slots so that they will not cut into your precious cells. While you're at it, file the sides of all three chassis pieces and run a bead of CA along these edges to strengthen them and make them less likely to fray.

■ On the top front chassis brace, file the rear of the servo opening back approximately 1/4 inch. This will allow you to mount the servo farther back and correctly align it with the steering links that are attached to the knuckles.

■ To mount the steering servo on the chassis, you'll have to remove one of its mounting ears. A Dremel tool with a cut-off bit works great for this, but you'll still need to finish the job with a file to ensure that the mounting surface is completely flat. Just remember that the servo must be mounted vertically with the output gear on top. Pick up some Du-Bro* adhesive lead-weight tape, cut off a 1-inch strip, and remove the covering from the adhesive backing. Glue the lead to the servo's mounting surface with CA, and then use Shoe-Goo to attach the servo to the chassis. Wipe off the excess glue. The top plate will secure the servo while the glue is drying. Adding the weight serves two purposes: it adds the proper weight to the front end, and it raises the servo to provide the right geometry for the steering linkages.

■ If you carefully inspect the ball cups, you'll notice that one side has a small hole and the other side has a slightly larger hole. Snap the ball cups onto the ball joints through the smaller holes.

■ Chassis tweak is very important on the Xpress Pro. If your car acts erratically, just run through this simple procedure. It's a simple process that requires only a Phillips-head screwdriver and a flat surface. Remove the vehicle's tires. Loosen the top screws on the center aluminum posts. Loosen the two screws on the front chassis brace where it's attached to the front bulkhead. Loosen the two screws on the rear chassis brace where it's attached to the rear bulkhead. Flip the car over and make sure all the bottom screws are tight. While holding the car's front and the rear down firmly on a flat surface, tighten the screws in this order: center, front, rear. That's all there is to it—pretty neat, huh?

■ To provide the correct geometry for the caster and camber links and prevent them from binding, move the front camber link back approximately 5mm (where the link is attached to the front shock tower). Do this by installing a longer screw and a spacer.

SETUP

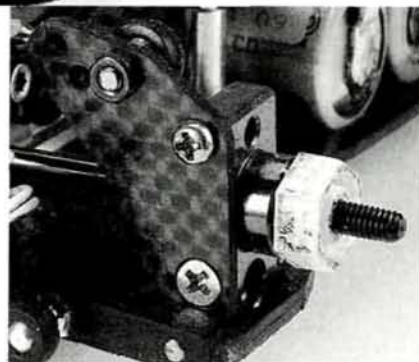
After trying many setups, I found this worked perfectly for me. This combo provides awesome steering both on and off power and allows plenty of rear traction without any push.

FRONT

- Oil: 45WT
- Pistons: stock
- Springs: Kyosho Green
- Internal/external limiters: none
- Preload: 15mm (initial setup)
- Camber: 1.5 degrees negative
- Caster-link length: 64mm (measured from one end of the ball cup to the other)
- Front ride height: 10mm
- Upper/lower shock-mounting position: as given in instructions
- Camber link: inside link spaced back 5mm
- Steering hubs: installed the left knuckle arm on the right side and the right arm on the left side
- Steering-link mounting position: forward hole on knuckle arm

REAR

- Oil: 35WT
- Pistons: stock
- Springs: Kyosho Orange
- Internal/external limiters: none
- Preload: 20mm (initial)
- Camber: 2 degrees negative
- Rear ride height: 10mm



The half-graphite, half-machined-aluminum rear hub carriers epitomize the adjective "trick." The universal drive shafts are standard issue.



The oil-filled shocks feature a threaded body for quick and easy spring-preload adjustment.

THE COMPETITION

	Team Losi STREET WEAPON	Yokomo YR4M2 USA	Tamiya TA03F-PRO	HPI RS4 PRO	Schumacher SST 2000 '98	OFNA Z10	Roadrunner XPRESS PRO
Wheelbase	10.19 in.	9.94 in.	10.1 in.	10 in.	10 in.	10.15 in.	10.25 in.
Width	7.25 in.	7.19 in.	7.19 in.	7.25/7.125 in.	7.25 in.	7.48 in.	7.4 in.
Diff type	Ball	Ball	Ball	Ball	Ball	Ball	Ball
Chassis	Composite	Graphite	FRP**	Graphite	Fiberglass	Graphite	Graphite
List price	\$349.95	\$380	\$356	\$329	\$369	\$379.95	\$450
Available at*	\$225	\$229	\$199.99	\$259.99	\$225	\$215.99	\$270
Reviewed in	12/97	11/98	10/96	10/97	12/96	4/97	4/97

*Prices vary with location. **Fiberglass-reinforced plastic



Tenth Technology by Matt Koch **Streetwise Stadium Truck**

FUN, EXCITEMENT, long-lasting entertainment. That's what R/C should be all about—right? You also want your vehicle to have some trick parts and be capable of some neat thrills. Of course, low maintenance would be nice, and let's not forget about making sure it looks awesome, too!

Well, Tenth Technology* has put together a machine to meet these demands and take it easy on your wallet. Borrowing technology from its big-buck, high-zoot, race-ready, four-wheel-drive Predator cars, Tenth Technology has packed a punch into its new entry-level Streetwise vehicles. The new machines are available in touring car, rally car and desert truck versions. I took the wheel of the off-roader to see whether that Predator performance would shine through.



trick truck



PHOTOS BY WALTER SIDAS

TENTH TECHNOLOGY STREETWISE STADIUM TRUCK



s p e c s

SCALE 1/10

LIST PRICE \$269.99
(available at \$199)

DIMENSIONS

Length overall 12.8 in. (325mm)
Wheelbase 10 in. (254mm)
Width (F/R) 7.9 in. (200.6mm)

WEIGHT

Gross, RTR 23.5 oz. (666gm)

CHASSIS

Type Tub
Material Composite plastic

DRIVE TRAIN

Type Shaft driven
Primary Pinion/spur
Transmission Dogbones
Differential(s) Ball
Slipper clutch None
Bearings/bushings Bearings

SUSPENSION (F/R)

Type Double wishbone
Damping Oil-filled coil-over shocks

WHEELS (F/R)

Type One-piece 5-spoke

TIRES (F/R)

Type Pin-spoke

ELECTRICS

Motor 540 type
Battery* Trinity Thunder Sport
ESC* Novak Racer

*Not included

BODY

How do you make an R/C truck great? How about using a rugged Ford stadium truck body airbrushed by a paint master. Scott Bich of Bich'n Bodies* spent countless hours on the WCW scheme. The truck looks like a real Baja racer. Add to that the one-piece, universal hex-drive rims and a set of pin-spoke tires and you're set for a great day in the sand or dirt.

540 MOTOR

Tenth Technology supplies a motor to get the truck running straight out of the box, but something a little peppier will expand the performance envelope.

YOU'LL NEED

- 2-channel radio.
- Electronic speed control.
- 7.2V battery.
- Paint for the body.
- CA glue.

SHAFT-DRIVE SYSTEM

The drive train is mostly factory assembled, and that cuts down on bench time. It's a very simple system; the motor's pinion drives a spur gear that is fixed to the "unidirectional carbon fiber" drive shaft. A bevel gear at each end of the shaft mates with a corresponding ring gear on each of the ball-type differentials. The Streetwise has far fewer meshing gears and moving parts than other 4WD chassis, and full bearings are included. That should make for a very efficient drive train that allows faster acceleration and longer run times. And, since there are no belts (or chains, for you old-timers) to skip, stretch, or fail, the shaft-drive system should prove extra reliable.



MOLDED CHASSIS

A one-piece, low-center-of-gravity tub made from a composite that is very rigid and strong.

SUSPENSION SYSTEM

The plastic-body shocks are mounted inboard (similar to an IndyCar's suspension). The orange shock body is complemented by a set of red-anodized shock shafts.

Up front, the bottom of the shock is mounted on the chassis, and the top is attached to a rocker assembly that rotates when the arm moves. This provides dependable front traction.

In the rear, the shocks are mounted on the upper arm and lie across the rear bulkhead—a cool-looking design.

PIN-SPIKE TIRES AND 5-SPOKE WHEELS

The firm, spiked tires should get the truck over all types of off-road terrain without any problem. The spoked wheels are reasonably stiff and use the standard 12mm hex common to all touring cars.

The wheels have an unusual diameter, however; they're larger than sedan rims but smaller and narrower than standard off-road buggy hoops.

TEST GEAR

• Futaba* Magnum Sport Radio with FP-R122 JP receiver • Futaba 148 servo • Novak* Racer speed control • Trinity* VIS Extra Thunder Sport battery pack • Optional: Trinity GTI modified motor.

BUILDING & SETUP TIPS

On opening the box, I was pleased to see just how well-thought-out and organized the kit was. The instruction manual is filled with detailed pictures—not a lot of text, but instead, clear illustrations. All the pieces come in numbered bags, and tiny, easy-to-lose pieces are together in a smaller bag. This made assembly simpler, easier and far less frustrating. It is nearly impossible to lose anything.

■ Camber is fully adjustable, front and rear. For much better traction through the turns, I set the Streetwise up with negative camber at both ends.

■ At first, I used the factory caster setting and the truck was nicely dialed, so left caster alone. Front caster is, however, fully adjustable, so you can tune the steering to suit your need for speed.

■ The pre-assembled diffs in my Streetwise were loose. If you hear any slippage in the front or rear while driving, tighten them with an Allen wrench.

■ If you tighten the screws down too much, the front suspension may bind. To avoid this, just snug up the screws and nuts with finesse.

■ The radio tray interferes with the front left tire when the suspension is compressed. Just grind or

file enough off the tray to prevent the tire from hitting it.

■ Before bolting the servo in, hook it up to your radio and turn it on to ensure that the servo horn will be properly centered. Once the servo has been installed, you do not have access to the servo-horn screw.

■ When you spin the wheels while building the Streetwise, the drive train seems to bind. The folks at Tenth Technology claim that this will free up after a few runs. Believe them, and don't tinker with it; it will smooth out just as promised.

Team ORION MOTOR TECH

with Oscar Jansen

PART THREE

Armature ABCs

In previous "Motor Tech"s, we learned about some of the differences between motor types and construction. This time, the armature—"arm," for short—is our focus.

Notice that it has three main parts, not including the wire:

1. The axle, or shaft. The axle is typically made of hardened, 3.14mm-thick (0.125 inch) stainless steel and has a flat side at the tip for the pinion setscrew. There have been some experiments with ceramic axles, but high cost and breakage problems have stalled their development.

2. The lamination stack. The three-pole stack is made out of very thin "slices" of silicon steel that are pressed together (stacked) to form a column of between 21.5mm (minimum regulated size) and 22.5mm. To protect it against damage and rust and to prevent its sharp edges from cutting the wire while it's being wound, the stack is hard-coated (that gives the arm its familiar green or blue color). Although the differences can be difficult to spot, armature designs vary. Some manufacturers use a lathe to turn down the armature's outside diameter; this increases rpm but decreases torque and efficiency. Rpm may also be increased by removing laminations to create gaps or slots in the stack.

3. The commutator, or "comm." Seen as a copper-colored barrel shape at the top of the armature, the comm, together with the brushes, is a critical part of the motor. It is easy to see the comm's three segments, which are made of pure copper. These segments are baked onto a ceramic isolation material that is pressed and/or glued to the axle. Commutator diameters vary. There are the so-called "big comms," which are about twice the diameter of a standard commutator. If tuned correctly, there is little difference between the performances of the two, but most manufacturers use the smaller, standard comm simply because they have long experience with this size.

After being wound with the appropriate wire for a motor's application, the armature must be balanced. Traditionally, this has been done by removing material (by drilling) from the laminations of the arm's heavier poles. Though this is effective, removing material from the laminations decreases motor efficiency and power, so the better motors (such as selected Team Orion motors) have epoxy putty added to the lighter poles to balance the arm without removing critical material.

In the next "Motor Tech," we will learn more about motor magnets and cans, and discover why today's designs are better than those of not so long ago. See you then, and good luck racing!

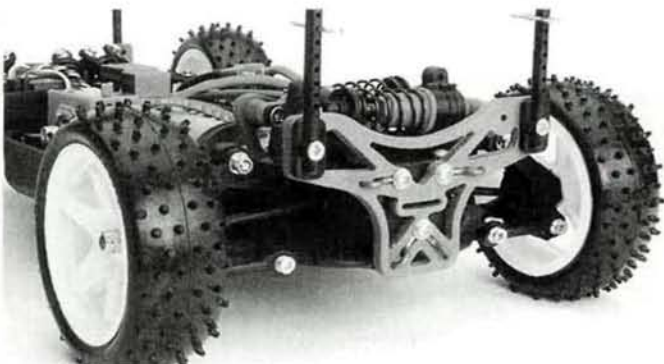
TENTH TECHNOLOGY STREETWISE STADIUM TRUCK



The inboard suspension system uses a tie rod and a rocker arm to actuate the shock from the suspension arm.

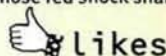


The rear shocks lie across the bulkhead. The shocks use very stiff springs to cope with the high leverage ratio of the system.



E-clips aren't used to hold in the hinge pins. Tenth Technology uses screws to retain the L-shaped pins, which protrude through the shock tower.

- Big-grip tires.
- Crisp acceleration and braking.
- Cool shock setup (love those red shock shafts).
- Full bearings.



Likes



dislikes

- Radio tray interferes with the front left tire.
- Only two pinion gears can be used (19- or 25-tooth).

PERFORMANCE

Accompanied by my 11-year-old-son, Mike, my testing ground was my backyard and the wooded lot next to my house.

To ensure that the steering would be perfectly dialed, I took a moment to adjust the trim on the radio, then I handed the controls to Mike. He yanked the throttle, and the Streetwise took off with an acceleration blast along the side yard and around to the back of the house. It had no problem handling the rugged terrain of the wooded area. My only problem was getting the radio back from Mike! I had to try it.

The Streetwise proved itself worthy. Its drive train delivered awesome acceleration, and its 4WD braking power was equally impressive, stopping the truck in a mere few feet. In the grass, we found it had a little too much traction in the turns (probably because of its pin-spoke tires), but it usually did a neat flip and landed back on its tires ready for more punishment. Wow! What can I say? I hadn't had so much fun in my own backyard in a long time.

With a multitude of charged battery packs and a Trinity GTI motor thrown in just for kicks, we were set up for an afternoon of fun. The modified motor gave this truck more ponies than we could sometimes handle, but it was a blast.

FINAL THOUGHTS

With the Streetwise, Tenth Technology has an awesome backyard basher worthy of neighborhood envy and ready for anything you put in its way. My son and I had a great time testing this truck and were impressed by how much punishment the Streetwise endured; when you consider its price, this is especially impressive.

If you're looking for an entry-level truck that offers a lot of bang for your buck and not a lot of hassle with assembly, the Streetwise definitely deserves your consideration. With its new look, innovative inboard suspension system and exciting handling, you can't go wrong with the Streetwise.

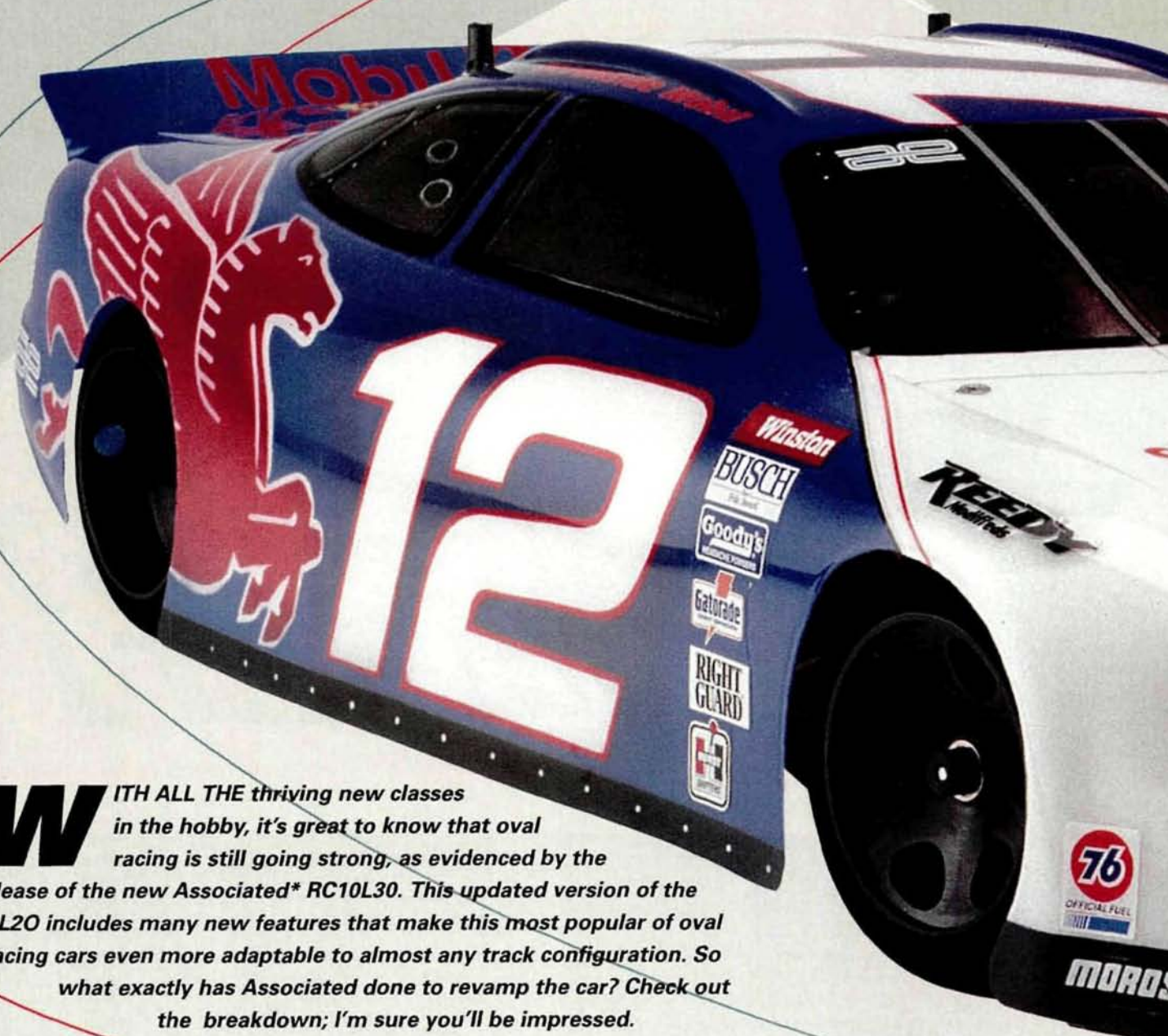
*Addresses are listed alphabetically in the Index of Manufacturers on page 241.

Associated **RC10L30** by Greg Vogel

BUILDING & SETUP TIPS

■ I know you want to get the kit built asap, but take a deep breath and commit yourself to prepping the chassis properly before you bolt anything onto it. The chassis has sharp edges that can be hazardous to you and any marshal who attempts to pick up your car. Using a flat file, round all the edges on the chassis, paying extra attention to the battery slots. Sharp edges where the batteries contact the chassis can cause an electrical short.

■ Pin the diff rings! High-horsepower motors will often cause the diff rings to slip. The axle hub is anodized where the diff ring seats, so it's even slicker than bare aluminum, and that virtually guarantees the inside ring will slip even with the diff nut clamped. If you have the optional anodized wheel hub, you're in double trouble. A diff-pinning kit with notched rings will solve the problem.



WITH ALL THE thriving new classes in the hobby, it's great to know that oval racing is still going strong, as evidenced by the release of the new Associated* RC10L30. This updated version of the 10L20 includes many new features that make this most popular of oval racing cars even more adaptable to almost any track configuration. So what exactly has Associated done to revamp the car? Check out the breakdown; I'm sure you'll be impressed.

Instead of pinning the diff rings, you could apply a dab of silicone diff lube (no. 6636) to both surfaces. You might think this would make the slippage worse, but it actually prevents the rings from slipping. This trick works for all but the highest-horsepower applications.

■ The kit we received had a defective center standoff between the rear T-bar pivot and the upper brace. The standoff wasn't threaded deeply enough for its mounting screws to be fully tightened. Associated replaced the part at no charge.

■ The screw that fastens the main shock to the chassis is much longer than required. Cut it to the proper length. If you don't, the screw could, at the very least, interfere with the batteries when mounted toward the center line of the chassis.

■ Make sure the shocks, especially the side shocks, are assembled with identical amounts of shock oil. The VCS microshocks are much easier to assemble than previous micro designs, but a little extra time spent here will yield great benefits in balanced handling. If one shock has more oil than the other, it will have more rebound pressure—like having more spring tension on that shock; this means the chassis is tweaked right off the bench.

PERFORMANCE

I'm no slouch on an oval, but I wanted a hardcore lefty to put the RC10L30 through its paces on a demanding carpet track. I handed the transmitter over to friend and fast guy Mike Valentine. Take it away!

To test the RC10L30, I went to K/N Speedway in Stafford Springs, CT. It's a high-banked oval that has hosted many big events and even a few nationals. If the car performs well here, it will be competitive anywhere because the K/N track is demanding.

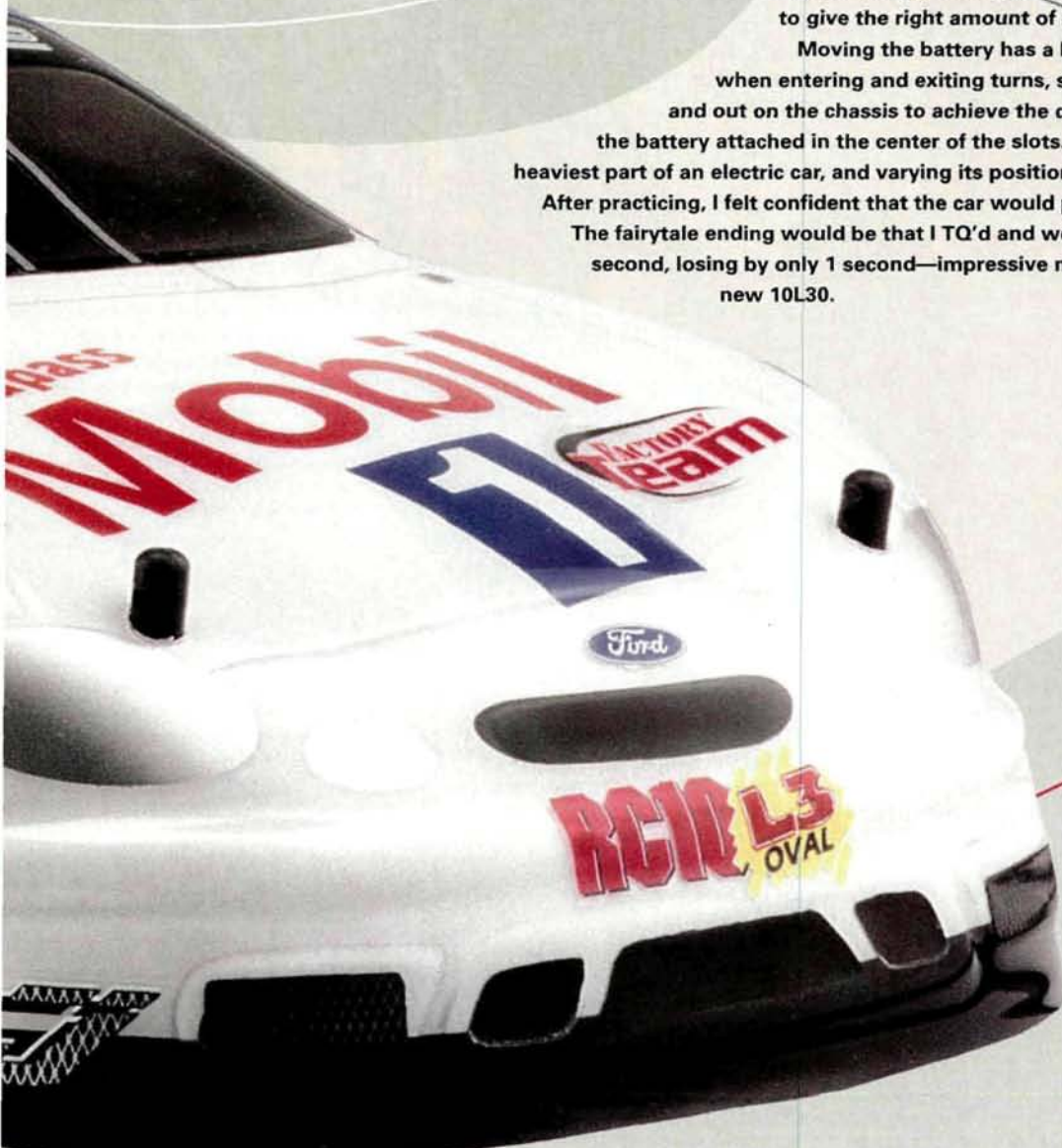
I decided to run a few packs through the car with the factory settings. It became apparent that the side shocks were just a bit too stiff for this track's tight turns. The weight transfer from side to side seemed too slow, but on this new triple-shock design, this problem is very easy to fix: I just used a lighter oil in the side shocks—quick and easy. After that, the car took the tight turns easily. The dynamic-strut front suspension worked well in the stock setup (0.020 springs).

Four green-compound Jaco tires are supplied—a long-overdue upgrade—but I found that the best setup was blues up front and the stock greens in the rear. This combination seemed to give the right amount of rear traction.

Moving the battery has a big impact on how the car responds when entering and exiting turns, so don't forget to move the battery in and out on the chassis to achieve the desired feel. The car felt best to me with the battery attached in the center of the slots. Remember that the battery is the heaviest part of an electric car, and varying its position can significantly affect its handling. After practicing, I felt confident that the car would perform well in races.

The fairytale ending would be that I TQ'd and won, but I qualified third and finished second, losing by only 1 second—impressive my the first time on a track with a new 10L30.

—Mike Valentine



PHOTOS BY WALTER SIDAS

Left turning point



s p e c s

SCALE 1/10
LIST PRICE \$285

DIMENSIONS (chassis only)
Wheelbase 10.5 in. (267mm)
Width (F/R) 7.25/7.75 in.
(184/197mm)

WEIGHT
Gross, RTR 41 oz. (1162gm)

CHASSIS
Type Pan
Material Carbon fiber

DRIVE TRAIN
Type Direct drive
Primary Pinion/spur
Differential(s) Ball
Bearings/bushings Bearings

SUSPENSION (F/R)
Type Associated
Dynamic Strut coil-spring/triple shock
Damping Friction/oil

WHEELS
Front/rear Pro-Line/Jaco

TIRES
Front/rear Pro-Line/Jaco green compound

ELECTRICS (not included)
Motor Reedy* Firehawk
Battery Reedy Zappers
ESC LRP* IPC V6

NEW REAR POD

The rear pod's graphite lower plate has two sets of mounting holes for the T-plate. This allows the rear pod to be offset to give you more tuning options for a greater variety of track conditions. The center of the three screws that fasten the pod to the T-plate can be left out for increased rear traction. The upper plate is bolted to the composite bulkhead and aluminum motor plate with three screws. The plate has three additional holes that allow you to move the pod to the offset position.

GRAPHITE AXLE

Associated didn't hold back anywhere on this car; a graphite axle with a blue-anodized diff-ring hub is standard equipment. The new, lightweight wheel hubs reduce rotating mass and ensure quicker acceleration. The left hub also features a clamping design to prevent the axle from being damaged by a setscrew.

TRIPLE SHOCK REAR SUSPENSION

The 10L30 still uses a T-bar design but now has a triple-shock damper system instead of the single unit found on previous 10Ls. A large-bore aluminum shock still damps front-to-rear flexing while two VCS microshocks damp side-to-side action. The VCS microshocks feature threaded bodies that allow fine, spring-tension adjustments.

GRAPHITE CHASSIS

The graphite chassis seems similar to the 10L20's, but two of the battery cross-braces have been removed to conserve weight. Also, there are extra holes up front to allow the suspension front components to be moved fore and aft for wheelbase adjustments. A thin graphite brace spans the T-bar pivot-balls to reduce flexing. Another graphite brace spans the rear of the chassis and is bolted to it in three places. This brace also supports the shocks and the rear body mounts.

TIRES

Don't expect to see the classic Associated spoked rims when you open the box. A full set of Pro-Line/Jaco green-compound foam tires are now standard.

DYNAMIC STRUT FRONT END

The Associated Dynamic Strut front-suspension system has found its way onto the new 10L30. Why mess with success? This race-proven system works smoothly and makes fine-tuning adjustments easy. The kit supplies standard in-line axles for aggressive steering.

OTHER GOODIES

The blue-anodized screws and ball studs used throughout reduce weight and give the car that cool factory look. A foam bumper protects the body and chassis.

FACTORY OPTIONS

Blue-anodized
—aluminum bulkhead—part no. 4537B.
—thrust cone/axle spacer—8213.
—VCS microshock—4471.
—standoffs—4442B.
—in-line axles—8843B.
—right hub (offset)—8459B.
—left hub (clamping)—8465B.
—right hub (standard)—8467B.
Magnesium right bulkhead—4538.
Carbon left bulkhead—4541.
Graphite through rear axle—4355.

YOU'LL NEED

- 2-channel radio.
- High-speed steering servo.
- ESC.
- Battery.
- Motor.
- Pinion.
- Body and paint.
- Fiberglass tape for the batteries.

TEST GEAR

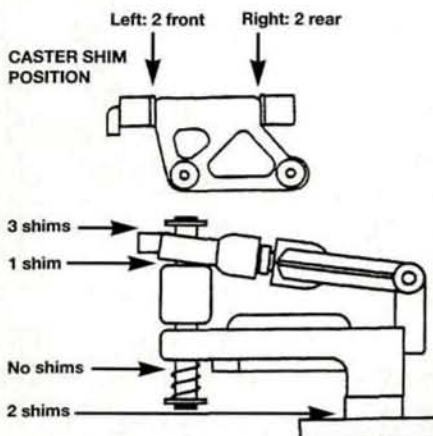
- Futaba 3PJ transmitter • Reedy Firehawk motor
- Reedy Zappers 2000mAh pack • LRP IPC V6 ESC.

SETUP

- **Track:** high-traction carpet—banked
- **Car width (F/R)**—stock

■ Front suspension

Upper arm mount.....	0°
Caster shim position (F/R, left/right).....	2
Camber (left/right).....	+1°/3°
Steering block.....	In-line
Toe-in/out.....	None
Springs.....	0.020
Kingpin.....	Standard
Shims.....	See diagram
Front ride-height spacers (2).....	See diagram



■ Rear suspension

Axle-height adjuster.....	No. 2 insert/hole up
T-bar thickness.....	Standard
Center shocks.....	Standard
—oil.....	Associated 30WT
—springs.....	Silver
—piston.....	No. 1
—preload spacing.....	5/16 in.
Side shocks.....	Standard
—oil.....	Associated 20WT
—springs.....	Blue

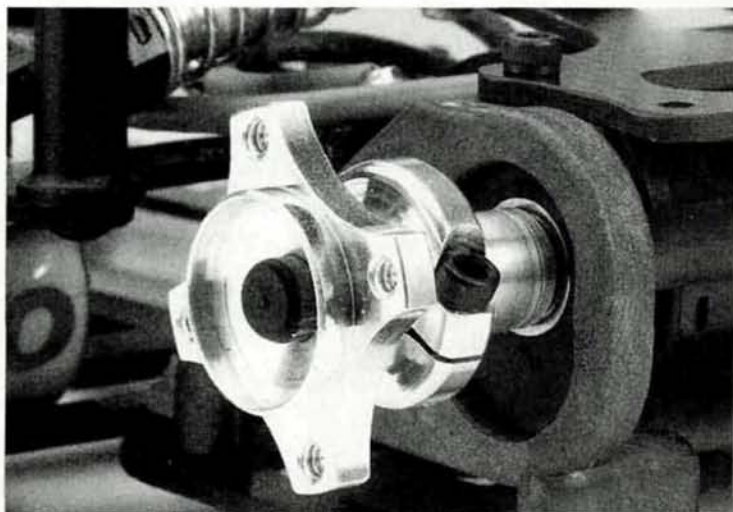
■ Wheels and tires (F/R)

Type.....	Blues/greens
Wheels.....	Pro-Line/Jaco
Tire diameter.....	2.25/2.3 in.
Tire treatment.....	Paragon Ground Effects
Stagger.....	None/0.010
Rear axle.....	Standard

■ Other

Chassis.....	Standard
Body.....	Protoform Taurus
Spoiler.....	1/2 in. tall
Motor.....	Stock
Pinion/spur.....	31/116
Batteries.....	Reedy
Pod.....	Standard
Battery-pack position.....	Middle of slots
Wheelbase.....	Standard

The old hubs have been put to rest. The RC10L30 uses a lightweight hub on the diff side and a clamping hub on the left side. No need for hop-up hubs here—unless you want some cool anodized parts, of course.

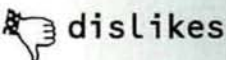


The 10L30 uses a new triple-shock system along with a T-bar for rear damping. Notice the extra holes on the top pod plate. These allow the shocks to be repositioned when you use the optional pod position.

- Stock Jaco tires.
- Wider battery slots.
- Three-shock rear suspension.
- Pod offset can be adjusted.
- Blue-anodized aluminum hardware.
- Titanium turnbuckles.



- 48-pitch gears.
- Diff rings slip on anodized axle hub.



FINAL THOUGHTS

Team Associated has really stepped up performance and adjustability in the new 10L30. The redesign of the rear suspension and many of the chassis components has brought the car up to an entirely new level of competition.

If you're looking to get into oval racing, or if you're already a competitive racer, the 10L30 could be the hot ticket to meet your need for speed.

*Addresses are listed alphabetically in the Index of Manufacturers on page 241.

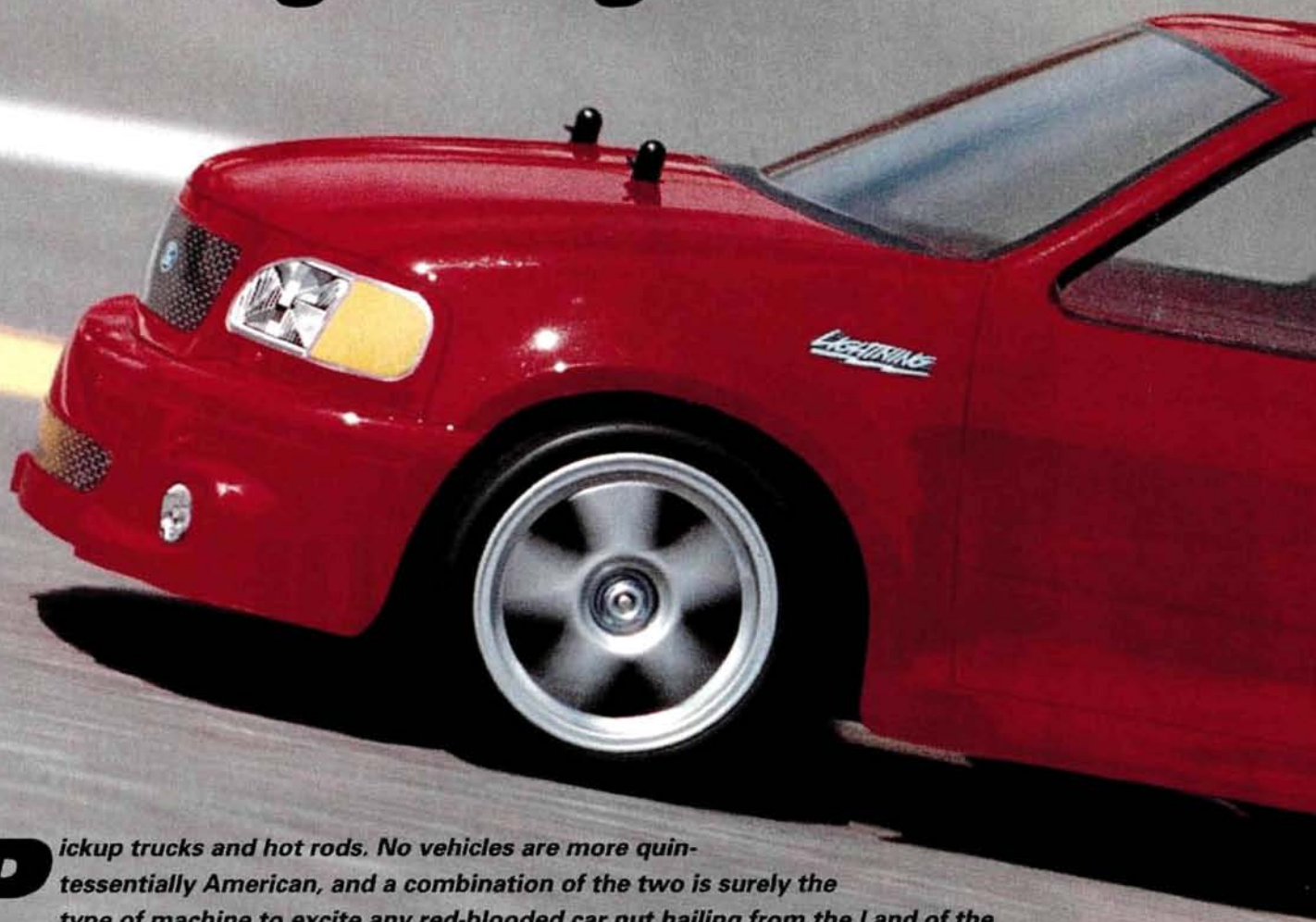
THE COMPETITION

	Motorsports HEAD HUNTER	Hyperdrive/PTI SSE	Trinity SWITCHBLADE 10SS	Parma/PSE PHAZE 1	Associated RC10L30
Wheelbase	10.1-10.5 in.	10.25 in.	10.5 in.	10.5 in.	10.5 in.
Width	7.25/7.75 in.	7.2/7.85 in.	7.25/7.75 in.	7.25/7.75 in.	7.25/7.75 in.
Weight	2 lb., 6.7oz.	2 lb., 10.5 oz.	2 lb., 10 oz.	2 lb., 9 oz.	2 lb., 9 oz.
Diff type	Ball	Ball	Ball	Ball	Ball
Chassis	Graphite	Graphite	Graphite	Carbon fiber	Carbon fiber
List price	\$399.95	\$285.95	\$299.99	\$425	\$285
Available at*	NA	NA	\$189.99	\$280	\$174.99
Reviewed in	6/98	—	7/97	7/98	—

*Prices vary with location.

Tamiya **Ford F-150 SVT Lightning**

by Peter Vieira



Pickup trucks and hot rods. No vehicles are more quintessentially American, and a combination of the two is surely the type of machine to excite any red-blooded car nut hailing from the Land of the Free. Ford has released just such a machine in the form of the F-150 SVT Lightning—a supercharged, 5.8-litre, V-8 powered tire wrinkler that can get a 4x8 sheet of plywood home in record time. To match the excitement in R/C form, Tamiya* has released a 1/10 version of the Lightning built around the popular TL01 4WD chassis. This is a bold move for the Big T; previous kits have stuck close to Euro-flavored racing and production vehicles. With a hot-looking American truck shell in place, all we can say to Tamiya is, "What took you so long?" Let's hit the street.

HOT-ROD

SCALE 1/10
LIST PRICE \$116

DIMENSIONS
Wheelbase 10.25 in. (260mm)
Width (F/R) 7.25 in. (184mm)

WEIGHT
Gross, RTR 55 oz. (1,560gm)

CHASSIS

Type 3-piece monocoque style
Material Plastic

DRIVE TRAIN

Type Sealed gear
Primary Pinion/spur
Drive shaft Dogbones
Differential Bevel gear (2)
Slipper clutch None
Bearings/bushings Bushings

SUSPENSION (F/R)

Type Lower A-arm w/fixed upper link
Damping Friction shock

WHEELS (F/R)

Type One-piece molded plastic
Dimensions (DxW) 2x1in. (50.8x25.4mm)

TIRES

Type Tamiya standard radial

ELECTRICS

Motor Mabuchi 540
Battery Not included
Speed control Mechanical



HAULER

PHOTOS BY WALTER SIDAS



Tamiya's faithful reproduction of the Ford F-150 body shows the usual attention to detail. No company does bodies like Tamiya!

TWO-PIECE SUSPENSION ARMS

The slab-sided suspension arms are actually hollow; each arm's halves are held together by a pair of screws. Threaded hinge pins join the arms to the chassis; there aren't any E-clips on the TL01 chassis.

YOU'LL NEED

- 2-channel radio and receiver.
- Two standard servos (or one servo and ESC).
- Stick-type 7.2V battery pack.
- Charger.
- Polycarbonate-compatible paint.
- Cyanoacrylate (CA) glue.

FACTORY OPTIONS

- TL01 parts
 - carbon propeller shaft—part no. 53323.
 - stainless-steel suspension shafts—53301.
 - turnbuckle tie-rod set—53300.
 - hollow carbon gear shafts—53322.
 - ball-bearing set—53292.
 - stabilizer set—53324.
 - adjustable upper arm set—53303.
 - lightweight chassis—53331.
- TA03 ball diff—53267.
- On-road tuned spring set (2)—53163.
- Aluminum front hub carriers—53226.
- Super-low-friction dampers—53280.
- Reinforced Super Slicks (type A)—53293.
- Universal shafts—53115.
- Blue-anodized wheel nuts—53159.
- Front one-way diff—53200.
- Shaped tire inserts—53250.
- Lightweight kingpins—53141.

CLAMSHELL CHASSIS

The Lightning's TL01 chassis is molded in three pieces that enclose the radio gear and drive-train parts once they have been assembled. Molded-in suspension arm mounts give the rear arms a touch of anti-squat and hold the front arms level. The shock towers are also an integral part of the chassis. Note the exposed steel drive shaft that spans the length of the vehicle.

MABUCHI 540 MOTOR

This mild-mannered motor makes learning to drive easier for newcomers, but it still has sufficient power to light up the stock tires. Long run times are a bonus; expect 8 to 10 minutes per pack with fresh 1700 or 2000mAh batteries.

"NO-BELLCRANK" STEERING

The upside-down steering servo is fitted with an extra-large servo-saver that is joined directly to the front hubs via molded links. The non-adjustable setup provides 2 degrees of toe-in.

RADIAL TIRES

The included treads are standard-issue Tamiya sedan tires. The tread compound is firm, so you don't need foam liners (which is fortunate, since they aren't included).

QUICK-RELEASE BATTERY TRAY

Stick packs can be loaded from either side of the battery holder. The chassis halves form a closely fitting "tunnel" to support the battery pack.

STEEL DRIVE SHAFT

Ain't no way this shaft is gonna flex! Bevel gears at each end of the shaft put the spin into the front and rear gearboxes, which feature a "3-gear" design.

PRESET GEAR MESH

Three sets of motor-mounting holes provide perfect gear mesh for the included 19-tooth pinion, or optional 21- or 23-tooth pinions.

BEVEL-GEAR DIFFERENTIALS

The metal-gear diffs have a silky feel, and the diff cases are wide and have broad teeth for a bomb-proof transmission.

FRICTION-DAMPED SHOCKS

The TL01 chassis is suspended by plastic, coil-over friction shocks. Internal rubber sleeves provide light damping by resisting the movement of the lubricated shock shafts that pass through them. Damping is light, and that results in a springy ride, but the shocks operate smoothly.

TEST GEAR • Futaba* Magnum Sport • Futaba S148 servo • Novak* Duster II ESC • Orion* matched Power Max battery pack

BUILDING & SETUP TIPS

I haven't come across a Tamiya kit that was hard to build, but the Lightning's TL01 chassis is especially easy to assemble. Patience is really all you need to build it right, but pay close attention to the following steps for a glitch-free build.

■ Step 2: before installing the steering servo-saver, make sure the servo's output shaft is centered; once the chassis halves have been joined, you won't be able to adjust the assembly. Tip: if your radio set included a 4-cell AA battery holder, keep it handy to power the receiver when centering a servo or testing radio gear that isn't installed in a vehicle.

■ Steps 7 to 9: less is more when it comes to gear lubrication. A small dot of

grease on each gear is plenty (the grease will be evenly distributed as the gears turn).

■ Steps 13 to 17: don't forget to install the O-rings in the outdrive cups ("gearbox joints" in Tamiya-speak). Although the instructions call for grease on the drive-shaft ends, leave 'em dry so they don't attract dirt and grit.

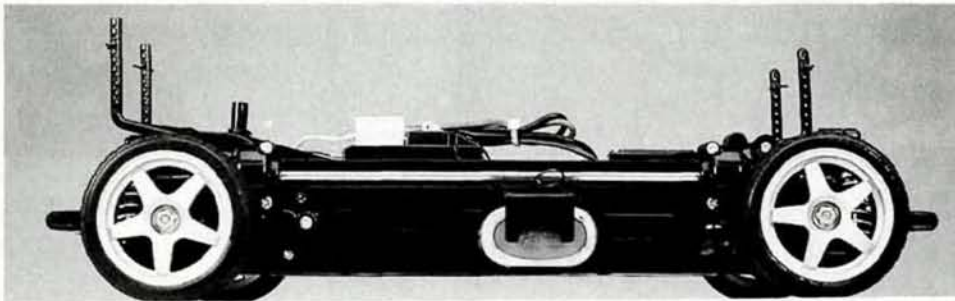
■ Step 21: lubricate your hobby knife with a drop of dish soap before you cut the rubber sleeves for the shocks. Try to make a straight, smooth cut, and measure precisely. Remember: measure twice, cut once.

■ Step 25: use a little rubber cement to hold the pins in the axles so they won't get lost when you remove the wheels for maintenance.

PERFORMANCE

As a full-time 4WD truck, the Lightning is easy to drive and very forgiving, with a slight tendency to push, or understeer. The kit tires don't offer a ton of traction, but that only makes the car more fun to drive. Sliding the Lightning through turns is where the fun is; with stickier racing rubber, that type of driving just wouldn't be possible.

The kit motor provides a decent amount of zip for tight courses, but the top speed isn't impressive when traversing wide-open parking lots; it feels much



The TL01's massive drive shaft is clearly visible here. Note the slightly forward battery position and the three sets of motor-mounting holes just ahead of the rear wheels.

SANYO

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regional races and
national races!!

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- Foolproof preset gear mesh.
- Low price.



likes

- Chassis isn't adjustable.



dislikes

faster when you're running around corner dots or slicing up a driveway. If you yearn for racier performance down the road, an ample supply of hop-up parts is available; for most modelers, an ESC, a hotter motor and ball bearings will top the "gotta-get" list once they've mastered driving the Lightning with the stock gear.

As long as the pavement was reasonably smooth, the kit's friction shocks did a good job of keeping the Lightning on an even keel. Larger bumps and cracks in the pavement tended to get the truck "out of shape" as the lightly damped shocks rebounded, but it was easy to recover. That's 4WD for ya! The Lightning encourages the same sort of let-it-all-hang-out fun that got us all on the sedan bandwagon in the first place.

FINAL THOUGHTS

The Ford F-150 SVT Lightning (or any of Tamiya's other TL01-chassis cars) is an excellent introduction to R/C model building. Since the kit uses friction shocks and gear diffs, there are no tricky building or setup steps, and the Lightning requires virtually no maintenance once it has been assembled (especially if ball bearings are installed). Optional ball diffs, oil-filled shocks and other parts can be added later to transform the Lightning into a competent club racer, but they aren't required to have a great time hack racing in the local parking lot. And if you spell "hack" with a capital "H," don't worry; the Lightning can take a serious pounding! Our test truck took a few good curb shots and had only a scarred bumper to show for it. The TL01 chassis is typically Tamiya in its high-quality construction, and the Ford F-150 SVT Lightning body adds a contemporary touch of street style. Good stuff.

* Addresses are listed alphabetically in the Index of Manufacturers on page 241.

.21 ENGINE

THE "BIG BLOCKS" OF

by Steve Pond

THE 3.5 CC ENGINES are the "big blocks" of nitro-powered off-road R/C racing.

They power the 1/8 buggies that are the premier class in the dirt. The most powerful 3.5cc engine could easily embarrass the average lawnmower, yet the little powerhouse nitro engines have only about 7 pounds of racecar to push around.

Here we show the most readily available .21ci (3.5cc) engines designed specifically for off-road applications, and the sidebars offer the info you need to run one successfully.



KYOSHO GS21R

BORE: 16.6mm
STROKE: 16mm
DISPLACEMENT: 3.46cc
WEIGHT: 380gm
RPM RANGE: 2,500 to 28,000
CLAIMED OUTPUT: 1.2b.hp @ 25,500
FEATURES: pull-start, glow plug, bolt-on exhaust adapter
STREET PRICE: \$175

O.S. Max 21RZ-B

BORE: 16.6mm
STROKE: 16mm
DISPLACEMENT: 3.46cc
WEIGHT: 332gm
RPM RANGE: 3,000 to 40,000
CLAIMED OUTPUT: 2.3b.hp @ 30,000
FEATURES: boost chamber, integral exhaust adapter, glow plug
STREET PRICE: \$265



O.S. Max 21RG

BORE: 16.6mm
STROKE: 16mm
DISPLACEMENT: 3.46cc
WEIGHT: 325gm
RPM RANGE: 3,000 to 35,000
CLAIMED OUTPUT: 1.9b.hp @ 30,000
FEATURES: bolt-on exhaust adapter; glow plug
STREET PRICE: \$148



GUIDE

NITRO BUGGY RACING



OPS *Speed Car Competition Pro*

BORE: 16.6mm
STROKE: 16mm
DISPLACEMENT: 3.46cc
WEIGHT: 280gm
RPM RANGE: 3,000 to 29,500
CLAIMED OUTPUT: 2b.hp @ 28,000
FEATURES: bolt-on exhaust adapter
STREET PRICE: \$156



OFNA *Force 21 P4*

BORE: 16.6mm
STROKE: 16mm
DISPLACEMENT: 3.46cc
WEIGHT: 318gm
RPM RANGE: 2,500 to 31,000
CLAIMED OUTPUT: 1.7b.hp @ 29,500
FEATURES: integral exhaust adapter,
port for optional boost bottle
STREET PRICE: \$107

OFNA *Force Delta 21 P8*

BORE: 16.6mm
STROKE: 16mm
DISPLACEMENT: 3.46cc
WEIGHT: 343gm
RPM RANGE: 2,500 to 35,000
CLAIMED OUTPUT: 2.6b.hp @ 34,500
FEATURES: integral exhaust adapter,
port for optional boost bottle
STREET PRICE: \$209



CHOOSING THE RIGHT TUNED PIPE

Choosing a tuned-pipe exhaust system for your 1/8 buggy can be as important as choosing the engine itself. Tuned pipes are a very essential part of a 2-stroke engine's performance. Choose the right one and you'll maximize the engine's power output. Choose the wrong one, however, and you'll wonder why all those electric-powered cars keep blowing by you.

Chamber volume and length have a lot to do with engine performance. The longer pipes with the larger chambers tend to favor bottom-end performance, while shorter pipes with lower chamber volume favor high-speed performance. Yet another pipe design has variable chamber volume to enhance all-around performance. So how should you choose a tuned pipe for your car?

- **Engine.** Engines with larger bores than strokes tend to develop power toward the higher rpm ranges. As the bore gets smaller and the stroke gets longer, the more the engine favors low-end performance. Check the bore and stroke dimensions of your engine, and buy a pipe that will supplement its performance—big-chamber pipes for long-stroke engines and small-chamber pipes for short-stroke engines.

- **Gearing.** Cars that seem to have a hard time accelerating can benefit from the bottom-end power of a large-chamber pipe. Conversely, cars that pull strongly on the bottom end but flatten out at high speeds should see the greatest gains from a small-chamber pipe.

- **Track conditions.** Small tight tracks favor quick throttle response, favoring large chamber pipes. Larger, faster tracks favor high-speed performance, which is prime for the smaller-chamber pipes.

.21 ENGINE GUIDE

BORE & STROKE

There was a time when the nitro car enthusiast was stuck with whichever engines were available on the hobby shop shelves. The recent growth in popularity of nitro-powered buggies, however, has resulted in a much greater selection of engines and, more specifically, engine configurations.

Engines are now available in a variety of bore and stroke configurations—long stroke and short stroke. The different bore/stroke ratios make the engines more application-specific.

Without getting too technical, simply knowing the basic information will help you point in the right direction when selecting a competition buggy engine.

- **Bore.** The inside diameter of the engine's piston sleeve, or the outside diameter of the piston.

- **Stroke.** The distance the piston will travel up and down within the bore, or sleeve. The typical 3.5cc engine has a 16.6mm bore and a 16mm stroke. This is what is referred to as an "over-square" engine (the piston's diameter is larger than the stroke). This configuration favors high-rpm performance at the expense of low-end torque. Other engines feature a more "square" configuration (bore diameter and stroke are closer to being equal). For example: a 16.42mm bore and a 16.42mm stroke. This is actually a perfectly "square" engine. As the bore dimensions shrink and the stroke measurement gets longer, the engine develops more and more torque at the expense of high-rpm performance.

So which engine would you choose if you were doing most of your racing on a short, technical track? To rocket your car from corner to corner without much concern for high top speeds, choose an engine with a smaller bore and a longer stroke because of its inherent low-end torque. Longer high-speed tracks favor the opposite: bigger bore and shorter stroke for high speeds with a slight loss of power out of the corners.

Will it make or break your efforts if you choose the "wrong" engine for your application? Certainly not! But if you're at the top of your game and you want to know what will get you that extra 2/10 second per lap, this is it!

MEGATECH PT07

BORE: 16.4mm
STROKE: 16.5mm
DISPLACEMENT: 3.47cc
WEIGHT: 220gm
RPM RANGE: 3,500 to 35,000
CLAIMED OUTPUT: 2.3b.hp @ 33,000
FEATURES: integral exhaust adapter, silicone gasket
STREET PRICE: \$187



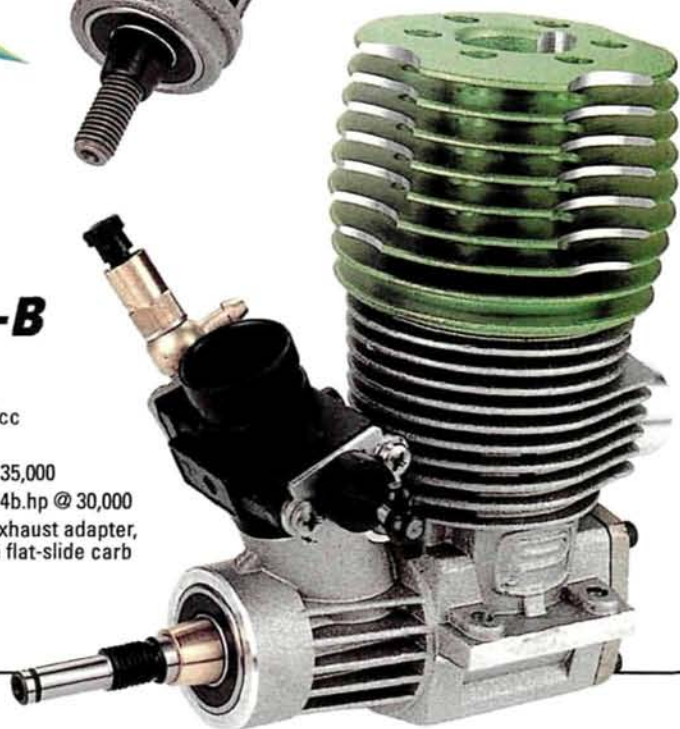
MEGATECH PT01

BORE: 16.4mm
STROKE: 16.5mm
DISPLACEMENT: 3.47cc
WEIGHT: 330gm
RPM RANGE: 3,000 to 29,500
CLAIMED OUTPUT: 2b.hp @ 28,000
FEATURES: integral exhaust adapter, silicone gasket
STREET PRICE: \$96



PICCO P21KS-B

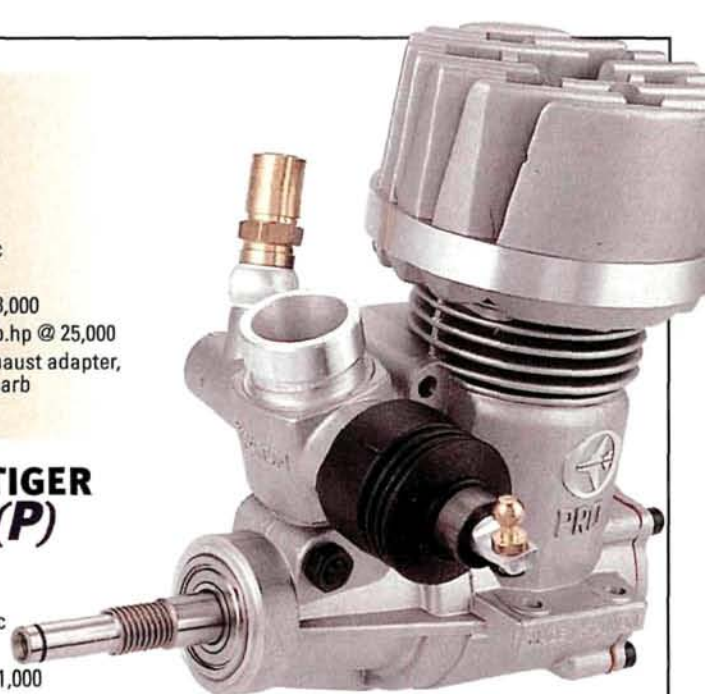
BORE: 16.4mm
STROKE: 16.5mm
DISPLACEMENT: 3.48cc
WEIGHT: 300gm
RPM RANGE: 3,000 to 35,000
CLAIMED OUTPUT: 2.4b.hp @ 30,000
FEATURES: integral exhaust adapter, composite flat-slide carb
STREET PRICE: \$298





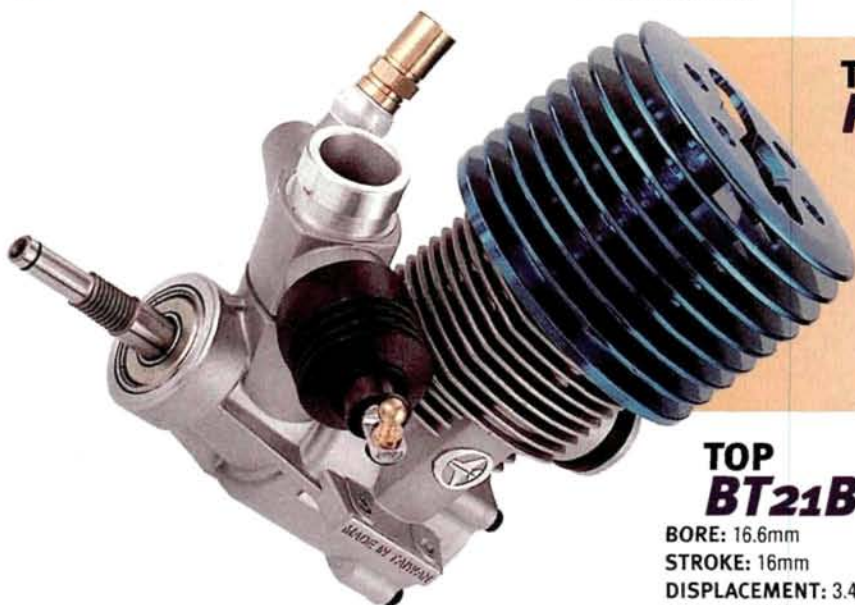
PICCO *P21 ES*

BORE: 16.4mm
STROKE: 16.5mm
DISPLACEMENT: 3.48cc
WEIGHT: 300gm
RPM RANGE: 2,500 to 28,000
CLAIMED OUTPUT: 1.1b.hp @ 25,000
FEATURES: integral exhaust adapter,
composite carb
STREET PRICE: \$133



THUNDER TIGER *Pro 21B(P)*

BORE: 16.8mm
STROKE: 16mm
DISPLACEMENT: 3.54cc
WEIGHT: 312gm
RPM RANGE: 2,500 to 31,000
CLAIMED OUTPUT: 1.2b.hp @ 28,000
FEATURES: side exhaust
STREET PRICE: \$87

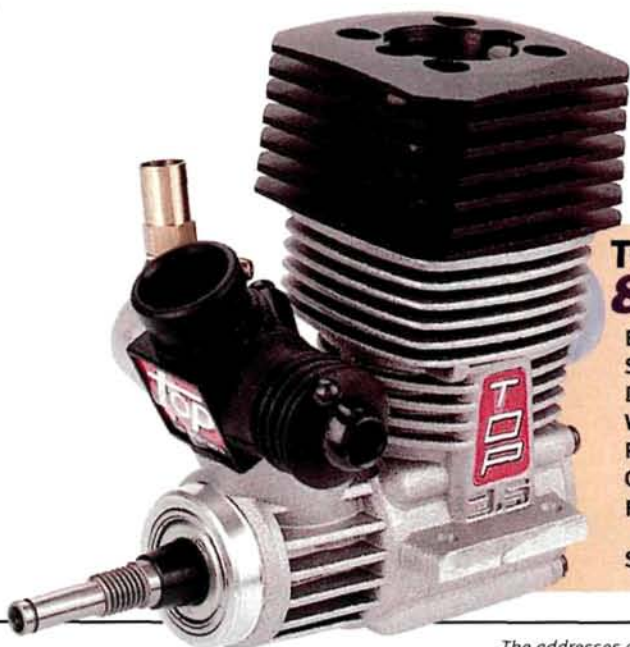


THUNDER TIGER *Pro 21B-R(P)*

BORE: 16.6mm
STROKE: 16mm
DISPLACEMENT: 3.46cc
WEIGHT: 292gm
RPM RANGE: 3,000 to 38,000
CLAIMED OUTPUT: 2.1b.hp @ 30,000
FEATURES: integral exhaust adapter,
silicone gasket
STREET PRICE: \$108

TOP *BT21BK*

BORE: 16.6mm
STROKE: 16mm
DISPLACEMENT: 3.46cc
WEIGHT: 331gm
RPM RANGE: 3,000 to 29,500
CLAIMED OUTPUT: 2b.hp @ 28,000
FEATURES: integral exhaust adapter,
silicone gasket; glow plug;
crankcase-mounted boost
chamber
STREET PRICE: \$232



TOP *8/S*

BORE: 16.42mm
STROKE: 16.42mm
DISPLACEMENT: 3.48cc
WEIGHT: 315gm
RPM RANGE: 3,000 to 29,500
CLAIMED OUTPUT: 2b.hp @ 28,000
FEATURES: integral exhaust adapter,
silicone gasket; glow plug
STREET PRICE: \$137



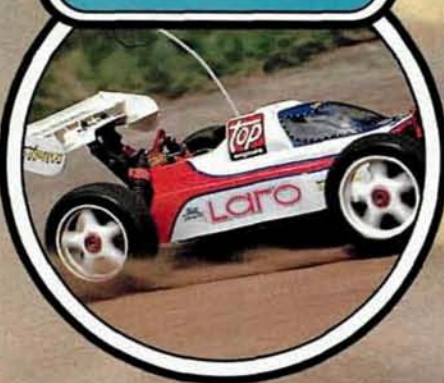
KYOSHO INFERNO DX-II



KYOSHO MP-5



LARO DIABLO D2



MUGEN MBX-4



1/8 SCALE 4WD NI

QUARTER-SCALE cars are the biggest, and on-
roaders are the fastest, but 1/8-scale buggies
are probably the wildest nitro machines you
can have at the receiving end of your transmitter.
They're loud. They're ballistic; they're powerful (too
powerful, usually); and they can rip around turns and
over jumps like nothing else. With more 1/8-scale bug-
gies available than ever before, it's not surprising that
this class is growing among club racers, and even
non-competitive enthusiasts are turning to the big
buggies for Sunday afternoon action.

Whether you're looking to roast the club competi-
tion or put a hurt on the guys at the local vacant lot,
there's a buggy here to fit your needs and budget.
Kyosho*, OFNA*, Mugen*, Laro* and Thunder
Tiger* are all represented. Since there's a lot more
to a buggy than the rolling chassis, we have the
scoop on selecting an appropriate radio system, plus
setup tips and how-to tuning info. And of course, we
rate 'em. From ease of assembly and kit complete-
ness to performance and value, each buggy has been
given an objective look. Check 'em out; which one ya
gonna get?

8

**EXTREME
MACHINES
DUKE**

PHOTOS BY WALTER SIDAS

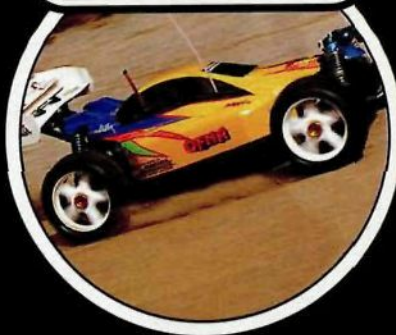
PRO BUGGY GUIDE

by Staff

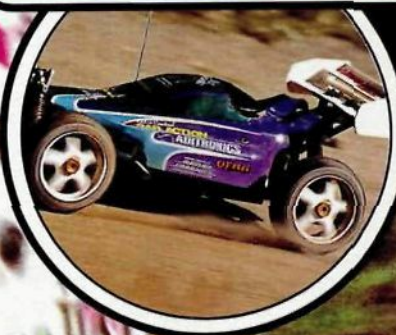
OFNA **ULTRA GT LX**



OFNA **HODR LX**



OFNA **ULTRA WORLDS GT**



THUNDER TIGER **MIRAGE V SPEC**



IT OUT!

KYOSHO INFERNO DX-II



Suspension

This is based on the suspension of the Turbo Inferno—the MP-5's popular predecessor. With its ultra-rugged, high-quality arms and heavy-duty aluminum-body shocks, it shows the benefits of the years of development that went into the high-end Inferno models.

Other features

A welcome molded rear wing replaces the older Lexan wing that crumbled at the sight of a tabletop jump or a high-speed corner. The rear wing mount is actually tougher than the one included with the MP-5, and aluminum cross-tubes keep it all together when it's on its lid.

The DX-II comes with many of the items not found on Kyosho's other top-of-the-line buggies—a manifold, tuned pipe, pipe mount, colored wheels and some trick, blue-anodized aluminum pieces.



Performance

The DX-II is marketed as a more affordable version of the MP-5, and its price tag belies its performance. This rugged buggy handles well and shows the benefits of more than 10 years of development. The free-wheeling differentials would benefit from a mix of heavy silicone lubes to slow them down a bit, and the shocks could use a pure silicone of somewhere around 25WT. But beyond a few little tuning needs, you can expect to get your moneys' worth from its performance. At high levels of competition, the DX will suffer slightly because of its dated suspension geometry, but it will certainly be a front runner at the club level.

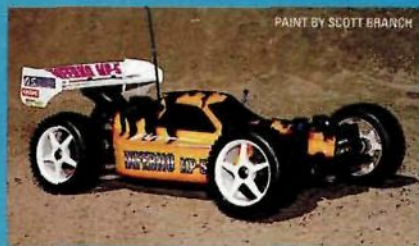
Drive train

There are durable bevel-gear differentials at the front center and rear of the chassis. The diff housings are sealed with a gasket, that allows the use of heavy silicone lube for fine-tuning diff action. The center or spur gear is made of a tough composite, but hardcore racers would be better off with the optional steel main gear.

Chassis

The chassis is a thick aluminum plate. Its channelled edges increase rigidity so it can take the tough pounding that's a feature of 1/8 off-road racing. A one-piece upper plate doubles as the radio tray and has space for the radio gear. The DX-II doesn't have a sealed radio box, and that limits foul-weather racing.

KYOSHO MP-5



Performance

Make no mistake about it: the MP-5 is world class all the way around. It may not be the most complete package, but once you get the details sorted out, you have one of the best 1/8 buggies that will ever hit the dirt. It's tough and very versatile; it can adapt to any track condition, and it does it at breakneck speed. If "Cost is no object" performance is your goal, the MP-5 should be on your shortlist.

Suspension

The MP-5 benefits from a host of new suspension features, the most significant of which is the 16 degrees of caster that help it handle the rougher Stateside tracks. Its new, blue-anodized shocks are as smooth as Kyosho's shocks have ever been and include a rubber boot to protect the shaft and seals from the elements.

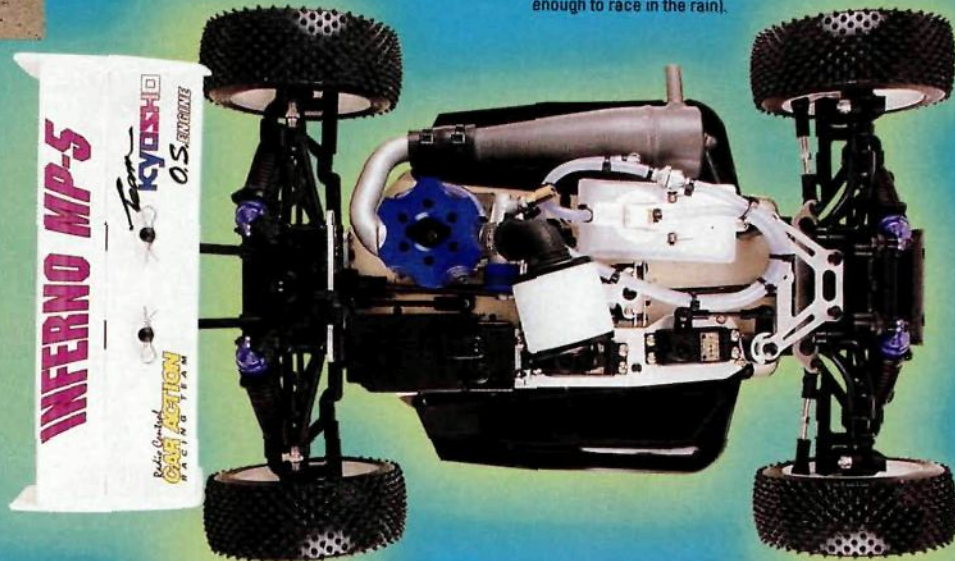
Drive train

This is standard fare—bevel-gear differentials front, center and rear. Like the DX's, the diffs are gasket sealed so silicone fluid can be used/added for diff tuning. The instructions don't include suggestions in this department, so you're on your own, but when you do get the diffs dialed, this car runs as if it's on railroad tracks!

Other features

Presumably to cut costs on this purebred racing machine, some of the trick colored stuff found on the less expensive DX has been omitted. "Substance over style" seems to be the mantra. It appears however, that Kyosho has gone a little too far in some areas and has left out certain "must have" items, such as a tuned-pipe mount and fiber brake disks.

Molded side guards, a sealed radio box and the rubber boots on the shocks greatly enhance this car's wet-weather tolerance (for those of you who are crazy enough to race in the rain).





Performance

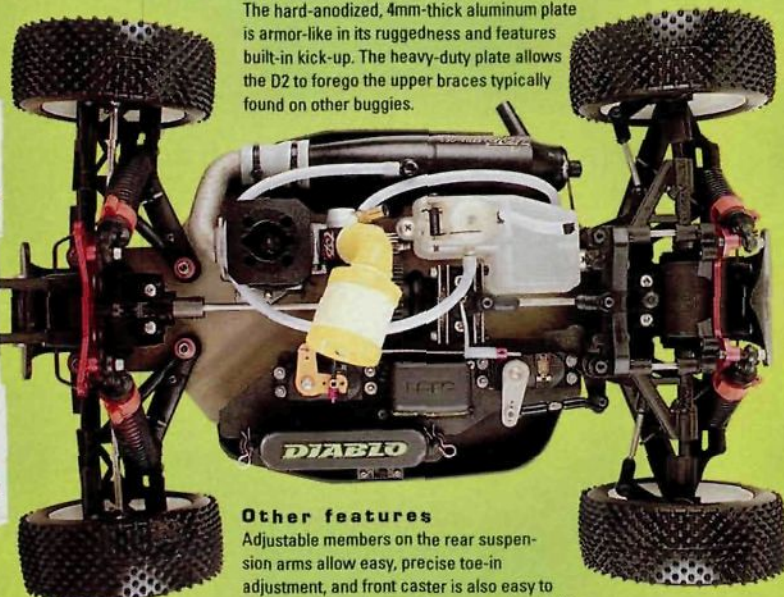
Out of the box, the stock Diablo D2 felt very plush, but ride height was definitely on the low side and the nose tended to dig in occasionally. It shone in the corners, however; only the sharpest turns required a touch of the brakes, and anything less than a hairpin was quickly straightened with the throttle on. Despite its unorthodox design, the D2 is a "no surprises" buggy.

Suspension

Instead of having in-board hinge pins on the lower suspension arms, the D2 has chassis-mounted pivot balls that provide a similar geometry to the Mugen MBX-4's canted-hinge-pin design. Plush shocks with unusual, molded extension caps provide the damping, and front upper A-arms along with threaded rear upper links allow camber adjustments.

Drive train

The center diff is joined to the front and rear diffs by a pair of in-line dogbones. Dogbones are also used for the rear drive shafts, while universals equip the front end. The diffs aren't sealed, so grease of various thicknesses must be used for tuning (instead of silicone oil). A pair of fiber brake disks haul the Diablo D2 to a stop. Although it's powerful, the D2's single-cam brake does not permit the adjustment of front/rear brake bias.



Chassis

The D2 wins the award for gnarliest chassis. The hard-anodized, 4mm-thick aluminum plate is armor-like in its ruggedness and features built-in kick-up. The heavy-duty plate allows the D2 to forego the upper braces typically found on other buggies.

Other features

Adjustable members on the rear suspension arms allow easy, precise toe-in adjustment, and front caster is also easy to change. The front upper A-arms may be slid fore and aft on their hinge pins to alter the front kingpin angle; spacers snapped onto the hinge pins hold the adjustment.

Suspension

Hands down, the MBX-4 is the most technically sophisticated 1/8 off-road machine ever. The front suspension borrows technology from 1/8 on-road racing: pivot-ball steering system, adjustable caster (13, 16, or 19 degrees), and adjustable track. The lower suspension arms swing on canted hinge pins, and that appears to prevent the wheel-base changes commonly found with cars using more caster and anti-squat in the suspension arms. The rear suspension features adjustable toe angle for increased stability when it's needed. Hard-anodized aluminum dampers at all corners top off the suspension.

Drive train

Compared with the suspension breakthroughs noted on the MBX, this drive train's features are standard fare for a competition buggy: bevel-gear differentials front, center and rear. The differentials feature sealed aluminum housings that are better than the plastic housings used on most other buggies. Significantly, the engine is now mounted on the "normal" (left) side of the car (earlier Mugen buggies have right-side-mounted engines). The center diff is mounted off-center on the chassis to allow a more central engine-mounting location for better handling, balance, etc.

Chassis

Kick-up is the order of the day for world-class buggies, and the MBX-4 is no exception. To improve rough-track handling, 10 degrees of kick-up is built into the chassis. The chassis plate is also channeled on each side to increase rigidity.

MUGEN MBX-4



Performance

The MBX and the MP-5 both steal the stage, but when the dust settles, Mugen's warrior scores more points. Its chassis is stiffer and its suspension is more adjustable, and that makes it a tough package to beat. Are we splitting hairs? Sure! It would be tough to build a car that could dominate the MP-5, but the added versatility of the new MBX-4 can consistently give it the slight advantage that makes the difference at the highest levels of competition.

Other features

Universal-joint drive shafts at all four corners smooth power delivery, but even so, the MBX cries out for MIP CVDs. Steel brake disks, steel spur gear and a "Terminator"-tough wing mount are a just a few of the hot-rod goodies that you'll find right in the box. With its host of anodized components and bolt-on side guards to keep it all looking good, the MBX also scores high in the style department.



OFNA HODR LX



PAINT BY MOTION GRAPHICS

Performance

The HODR's pivot-ball knuckle attachment shortens the arms and takes a little away from the handling. Nonetheless, the car handled the test track very well. The other downside is that the steering is limited, so a little more braking is necessary. The HODR did, however, prove itself durable enough to take a lot of rigorous, nonstop jumping; in fact, it would be an excellent choice for enthusiasts who just want to play around with one of these powerful machines.

Drive train

Three bevel-gear differentials outfit the HODR's drive train. They are not sealed, so they require high-temperature grease to alter their stiffness. Dogbones join the front, center and rear diffs while universal drive shafts spin the front wheels. A full set of bearings is also included.

Other features

The HODR comes with a manifold, a pipe and a pipe mount. Adjustable dual disk brakes, rear anti-roll bar and big, spiked tires are also standard equipment.

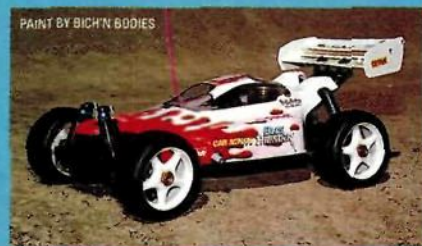
Chassis

A thick, narrow chassis plate makes a sturdy platform and all screw holes have been countersunk. The bright-blue-anodized radio tray, differential bridge and front brace strengthen the chassis.

Suspension

Up front, upper and lower A-arms are connected to the steering knuckles by means of oversize pivot balls. To allow easy camber adjustment, the rear suspension has adjustable upper links.

OFNA ULTRA GT LX



PAINT BY BICH'N BODIES

Performance

This is similar to the HODR's because these two buggies have similar suspension components. When thrashing on the GT, however, we were a little more comfortable knowing that we could push it harder and not worry about flexing the chassis.

Drive train

Take a look at the HODR, and you'll see the same drive train; smooth ball bearings and bevel-gear diffs are also used on the GT.

Other features

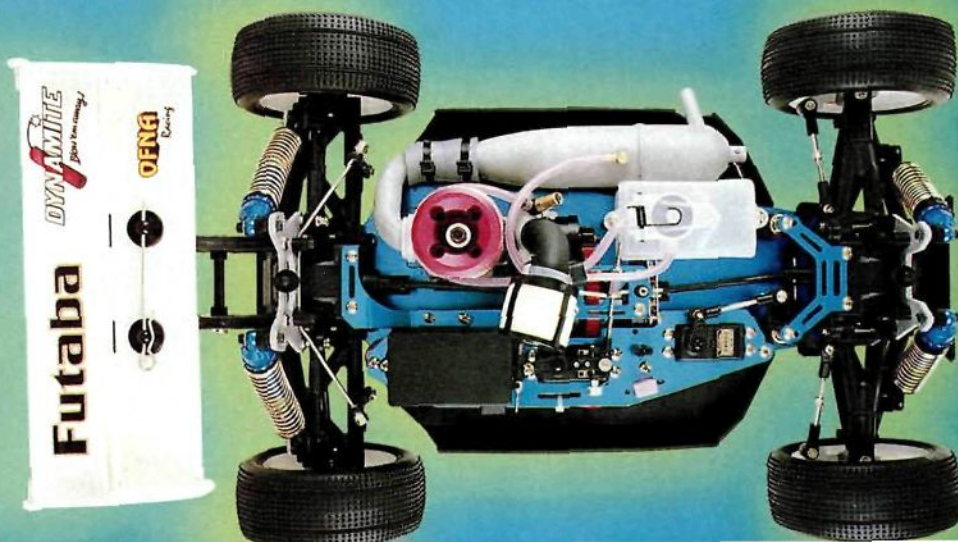
The aluminum radio-tray mounts and receiver cover may seem insignificant, but they stiffen the chassis and protect the radio gear. The Ultra GT's dirt shields keep out debris.

Chassis

Here is where the changes begin. First, there's the bright, blue-anodized chassis; a new top plate spans the right side and supports the servos and receiver; and a brace that goes from the radio tray to the rear bulkhead increases chassis strength. The radio equipment is now mounted on the right, and the fuel tank is now in front of the engine.

Suspension

Up front, you'll find pivot-ball-supported knuckles and A-arms; in the rear, there's a turnbuckle instead of an adjustable upper arm. Blue-anodized shocks damp the four corners.





OFNA **ULTRA WORLDS GT**

Performance

The Ultra Worlds GT's suspension makes it an excellent choice for local-track competitors. It's made of softer, but durable plastics that allow it to take a lot of abuse, but these plastics reduce responsiveness, so it might not be the best choice for serious racers. With its kick-up and improved suspension-arm geometry, the Worlds handles well and is stable over large jumps, and it's easy to tune it to track conditions. The sealed diffs are a great improvement on the former planetary units.

Chassis

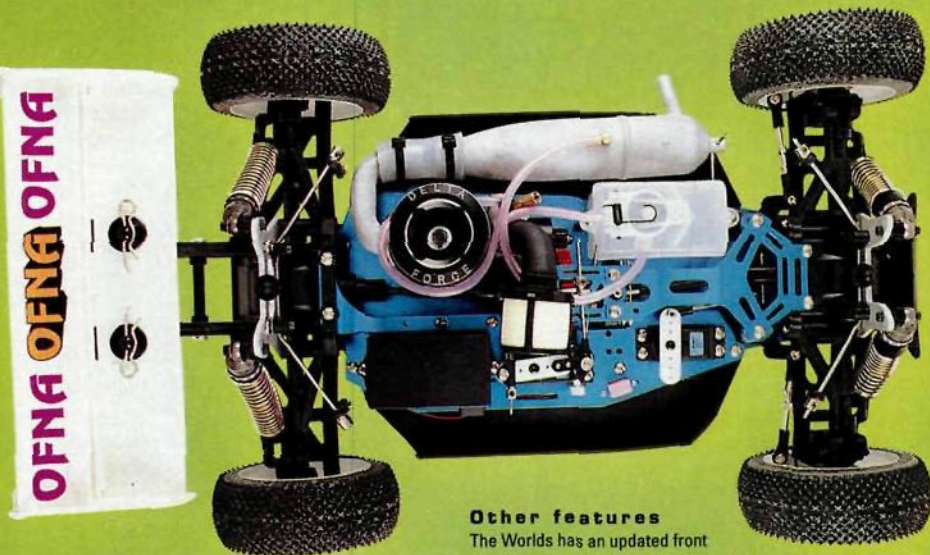
With its countersunk screw holes, the bright blue chassis resembles the Ultra GT's but has a kick-up in its nose. This greatly improves handling through the rough stuff. Bracing resembles that of the GT, but there's now an additional front brace between the steering

Drive train

The diffs may look like OFNA's original planetary diffs, but they're actually competition-style, sealed, bevel-gear diffs. This means that diff-fluid viscosity can be varied to alter their stiffness. Of course, the drive train rides smoothly on a full set of bearings, and front universal axles are included,

Suspension

This isn't like those on the other OFNA kits: to improve suspension travel, the front and rear lower H-arms are bent downward. An aluminum steering knuckle attached to a knuckle carrier increases steering and improves handling because it allows the H-arm to extend farther into the wheel. The rear also has a rigid hub carrier and an adjustable upper A-arm link. The shocks are hard anodized and have rubber shock boots to keep out dirt.



Other features

The Worlds has an updated front shock tower to go along with its racing geometry, and a front sway-bar keep it firmly planted on smooth tracks. The three-shoe clutch and included pipe and manifold offer extra value for money.

THUNDER TIGER **MIRAGE V SPEC**

Suspension

Nothing unusual here; lower A-arms, front upper A-arms and rear camber links make up the V Spec's durable suspension system, and all have turnbuckles that allow fast, easy adjustment. Cast front hubs and plastic hub carriers handle the steering, and the tie rods have turnbuckles. The kit's blue-anodized shocks are smooth and perform reliably.

MIRAGE V SPEC



Chassis

The deeply anodized chassis has stamped-in kick-up and is suitably thick, but it exhibits a bit of flexing because the radio tray, center diff and gearboxes aren't joined by any braces.



Performance

Given its impressive list of features, the Mirage V Spec performs as well as you would expect. The Thunder Tiger Pro 21 engine ran reliably and provided a very smooth power band that made the car easy to control. The Mirage V Spec is a competent, well-equipped racecar at a very reasonable price.

Drive train

In-line dogbones join the center diff to the front and rear units, and all feature nicely finished aluminum cases. A steel main gear is a welcome addition, and dual composite brake disks provide ample "whoa" and have better wear characteristics than mere plastic disks. Dogbones transfer power to the rear wheels, and universals equip the front end.

Other features

The Mirage V Spec includes some nice finishing details. Shock "booties" protect the shafts and seal them against dirt and dust, and a large, fully sealed box encloses the receiver and the battery. For convenience and safety, the switch mount that is built into the radio box has a rubber cover to protect the receiver from the elements.

STAY IN CONTROL!

With any type of R/C car, radio trouble is annoying, but with an 1/8-scale nitro buggy, you really don't want any glitches or—gulp—range problems. A runaway car will almost certainly become a broken car, and even the least expensive car in this guide isn't what you'd call "cheap." Keep these tips in mind when you set up your buggy:

1. FM is good, PCM is better.

A big buggy will run with less expensive gear, but if you can, buy one of the better FM or PCM radios. PCM transmitters such as the Futaba* 3PJ and JR* R1 allow you to select a fail-safe mode that automatically returns the steering and throttle servos to a user-set position (usually full brake!) if the transmitter signal is lost. Even without fail-safe, FM radios provide extra security by way of their stronger signal and greater glitch resistance. The second-tier FM radios offered by the major manufacturers are excellent; the Futaba 3PDF, Airtronics* CX2P, and KO* Presto all offer a bunch of tuning features and FM operation. For FM on a tighter budget, check out the Hitec* Lynx FM. Although it lacks many of the tuning features found on other radios, it's about half the price.

2. Check the clutch bell.

If the clutch bell touches the flywheel, the rattling generates a lot of radio "noise." Shim the bell so it does not touch the flywheel. Also, be sure to keep the clutch needle bearings well lubed to insulate the rollers from the metal bell and clutch nut.

3. Position electronics carefully.

To avoid any interference caused by the engine's reciprocating parts, keep the receiver as far away from the engine as possible. Also, keep the receiver away from fuel; some manufacturers seal the receiver in a chassis-mounted plastic box to protect it. If your car is not so equipped, cover it with a balloon or receiver cover.

4. Use a throttle return spring.

Team Losi offers a throttle return spring that can be fitted to the slide carbs used on .21 engines and also to throttle linkages used in other applications. If the servo fails or loses power, the spring will close the throttle and prevent a vehicle runaway.

5. Big cars need strong servos.

This has nothing to do with glitching and everything to do with being able to steer around a potentially damaging obstacle (like someone else's car!) or stop before reaching it. "Standard" servos generate about 40 ounces of torque, and that isn't sufficient for positive control. A strong steering servo is a must; install a unit with at least 80 oz.-in. of torque. A standard servo will provide acceptable, if uninspiring, throttle and brake action, but a more powerful servo (60 ounces or more) will allow the brakes to work effectively. That means you will brake later for faster laps, and you'll be able to stop the car before it smacks into something!

HOW WE RATED THEM

COMPLETENESS

Does the kit contain everything you need? Complete 1/8-scale buggy kits should include full bearings, shock oil, diff lube, a pipe and a manifold.

INSTRUCTIONS

Clarity is everything; crisp illustrations and concise written instructions earn high marks.

EASE OF ASSEMBLY

Extensive hand-fitting, scattershot parts and "impossible" assembly steps are not acceptable. A perfect "10" kit has logically bagged parts, goes together without a hitch and doesn't require the skills of a micro surgeon.

MAINTENANCE

The key questions are: how often does it need maintenance, and how easy is it to maintain? Easy parts access and long-lasting settings score high.

PERFORMANCE

After spending considerable track time with each car, we came up with a number that sums up its turning and jumping prowess as well as its all-around agility.

QUALITY

This one can be a little nebulous. We're looking for well-molded plastic parts, well-formed stampings, vibrant anodizing (on some cars) and good material choices, but there's also that tough-to-quantify feeling of superior manufacturing.

	KYOSHO		MUGEN	OFNA
Features	Inferno MP-5	Inferno DX-II	MBX-4	Ultra Worlds GT
Wheelbase	325mm	330mm	325mm	323mm
Width	300mm	305mm	306-310mm	303mm
Weight RTR	3,200gm	3,085gm	3,400gm	3,402gm
Aluminum chassis	2.5mm channelled	2.5mm channelled	3mm channelled	3.2mm
Sealed diffs	Yes	Yes	Yes	Yes
Chassis kick-up	8°	0°	10°	6°
Turnbuckle tie rods	No	No	Yes	Steering only
Front upper arm type	A-arm	A-arm	A-arm	A-arm
Rear upper arm type	Adjustable A-arm	Adjustable A-arm	Turnbuckle link	Adjustable A-arm
Sealed receiver box	Yes	No	Yes	Yes
Swaybars	F/R	None	F/R	F/R
Main gear	Plastic	Plastic	Steel	Plastic
Pipe/manifold included	No	Yes	No	Yes
Universals	Front	No	Front/rear	Front
Brake disk	Plastic/rubber	Plastic/rubber	Steel	Fiber
"Street" price	\$470	\$310	NA	\$330

The Difference

Most of us are familiar with the ball differentials in 1/10-scale cars; they are easily adjusted by means of a single bolt. Though they're very smooth and effective, this type of diff can't withstand the rigors of 1/8 nitro buggy racing. The powerful 1/8 buggies would eat up a delicate ball diff, so stronger gear diffs are used.

Regardless of diff type, a diff allows the drive wheels to receive power as the wheels turn at different speeds through a turn. Remember that in a turn, the wheels on the inside have a shorter distance to travel than those on the outside, and they should therefore turn more slowly than the outside wheels. In this situation, a very "free" or "loose" diff easily allows the outside wheels to travel faster than the inside wheels. Conversely, a "tight" diff resists this and will provide less differential action.

How do you "tune" a gear diff? Technically, you can't "adjust" it, but you can use grease or silicone lubes of various viscosities within the diff housing.

Non-sealed diffs use grease because it's thicker and less likely to leak from the housing. The more desirable sealed diffs can, however, take advantage of the more consistent heavyweight silicone diff lubes.

Exactly how does changing diff lube alter a car's performance? Let's use the Kyosho MP-5 as an example. A good all-around setup for it is: front diff—5,000WT (medium-weight) silicone; center diff—7,000WT (heavy) silicone; rear diff—3,000WT (light) silicone.

• For *high-traction* conditions in which you need a more equal front/rear power distribution, you may want to use 10,000WT in the center diff. Front and rear diff lube has a great effect on how a car handles. If the front end is understeering (pushing), use a lighter fluid in the front diff for better steering response; in the rear, you'll need a heavier fluid to reduce rear bite so that the car will snap tightly around the corners. If the car is oversteering, i.e.,

the front end is hooking, the opposite is true, i.e., use a heavier lube in the front diff.

• For *low-traction* conditions, use a lighter, low-viscosity lube (lower weight number) all the way around. This will provide more overall traction, and fine-tuning for understeer/oversteer works in the same way.

The long and short of it is that for high-bite tracks, you should use heavier (higher weight number) lubes in the center diff, and for low-traction conditions, use a lighter lube in the center diff than in the front and rear diffs.

• To reduce bite in the corners and improve straight-line acceleration and stability, use heavier lubes in the front and rear diffs than in the center diff. Conversely, lighter lubes front and rear improve steering response while reducing straight-line stability.

See what a difference this all makes (groan)?

	BUGGY	COMPLETENESS	INSTRUCTIONS	EASE OF ASSEMBLY	MAINTENANCE	PERFORMANCE	QUALITY	COMMENTS
KYOSHO	MP-5	5	9	7	8	9.5	8.5	A great car, but scores low in completeness because the pipe, manifold, coupler, pipe mount, shock oil and diff oil are not included. A steel main gear and fiber brake disk instead of the plastic kit pieces would also be nice.
	Inferno DX-II	9.5	8.5	8.5	8	8	8.5	Excellent all-around car; race worthy yet beginner-friendly; high-quality parts and a forgiving attitude on the track.
LARO	D2 Diablo	8.5	6	8.5	7.5	9	8.5	The instructions need improvement, but this unconventional, competition-ready buggy impressed us with its performance.
DAUGEN	MBX-4	9.5	9.5	7	9	10	9.5	This is a competition-class vehicle that's at the top of its game. Looking for a car you can drop on the track and go racing at a world class level with? This is it!
OFNA	HODR LX	9	6.5	6	6.5	6.5	7	All three OFNA buggies are largely preassembled from the factory, but extensive disassembly is required to get them ready to run, hence the low "Ease of Assembly" score. Performance of the three machines was hampered by the flexible plastic bellcranks used on all; the addition of OFNA's optional aluminum bellcranks would bring up the "Performance" marks a full point for each. The HODR is well-equipped with full ball bearings, a smooth set of aluminum shocks and universal front drive shafts. The GT ups the performance ante with a stiffer chassis, and OFNA's best buggy, the Ultra Worlds, adds a kick-up chassis and revised suspension components to the mix. Kudos to OFNA for including extras like pipes and manifolds with their kits!
	Ultra GT LX	9	6.5	6	6.5	7	7	
	Ultra World GT	9	6.5	6	6.5	7.5	7	
THUNDER TIGER	Mirage V Spec	10	9	8.5	8	7.75	9	The V Spec is well suited to serious club racers and newcomers to 1/8 scale. It includes turnbuckles, aluminum diff cases, steel main gear and eye-catching, blue-anodized parts; also an excellent value.

OFNA		LARO		THUNDER TIGER	
Ultra GT		HODR		Diablo D2	
320-325mm		320-325mm		322mm	
305mm		305mm		318mm	
3,400gm		3,370gm		3,464gm	
3.2mm		3.2mm		4mm	
Yes		Yes		No	
0°		0°		7°	
Steering only		Steering only		No	
A-arm		A-arm		A-arm	
Turnbuckle		Adjustable A-arm		Threaded link	
Yes		No		Yes	
Rear		None		F/R	
Plastic		Plastic		Plastic	
Yes		Yes		No	
Front		Front		Front	
Fiber		Fiber		Fiber	
\$230		\$230		\$410	
				Mirage V-Spec	
				324mm	
				295mm	
				3,400gm	
				3mm	
				No	
				7°	
				Yes	
				A-arm	
				Turnbuckle link	
				Yes	
				Rear	
				Steel	
				Yes	
				Front	
				Composite	
				\$270	

*Addresses are listed alphabetically in the Index of Manufacturers on page 241.

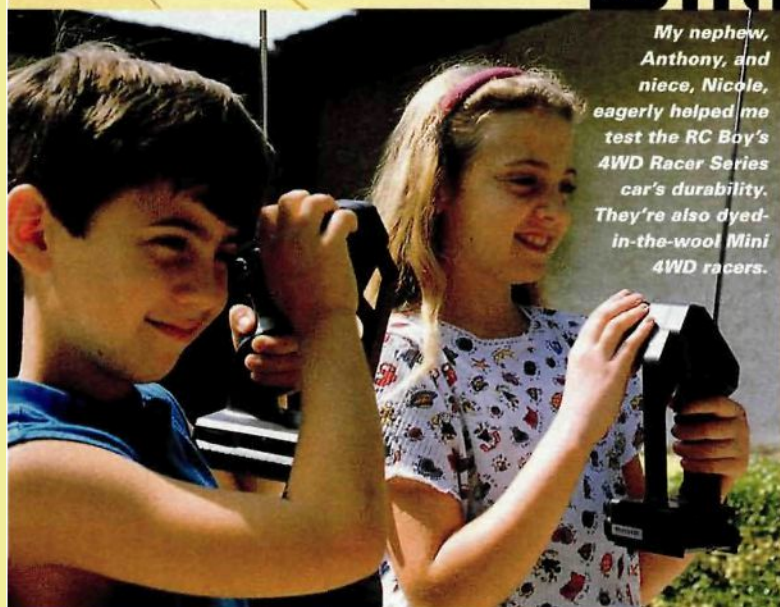
FIRST LOOK!



The Voltec fighter shown here launched the RC Boy's 4WD Racer Series. Tamiya has since added two more models to the line.



Get 'em while they're **YOUNG**



My nephew, Anthony, and niece, Nicole, eagerly helped me test the RC Boy's 4WD Racer Series car's durability. They're also dyed-in-the-wool Mini 4WD racers.

Tamiya's RC Boy's 4WD Racer Series

by George M. Gonzalez

THEY'RE EVERYWHERE! Whether lined up along the track barriers or ambling up on their BMX bikes as you do a little R/C cruising on the local parking lot, you'll see them: younger kids on the outskirts of the hobby looking for a way to get in. Some of them might think that building a car is too difficult; others perhaps believe that any form of model racing will be just too expensive for a fourth-grader's budget. Tamiya* recognizes that these kids are the future of our hobby/sport and puts a lot of faith in the "get 'em while they're young" philosophy—not just for Tamiya's sake but for the hobby as a whole. To draw the newcomer into the hobby, Tamiya has created a new line of vehicles aimed squarely at the young first-timer—the RC Boy's 4WD Racer Series.

PHOTOS BY GEORGE M. GONZALES

FIXED SUSPENSION

Burly upper and lower arms secure the steering arms, and one-piece plastic tie rods link them directly to the steering servo. All the pivots are captured, so parts can't pop off, and the heavily reinforced arms are incredibly tough to withstand those learning-to-drive mishaps.

SHAFT DRIVE SYSTEM

A massive, hexagonal drive shaft spins the front and rear diffs, and is completely sealed from the elements. Once built, the drivetrain is essentially maintenance free.

The RC Boy's 4WD's smart battery-mounting system does not require body removal for battery changes.



This look inside the RC Boy's 4WD racer reveals the simple layout—very attractive to first-time R/C drivers.

BEVEL-GEAR DIFFERENTIAL

Tamiya gear diffs are easy to build, operate smoothly, and are just about bomb proof. To simplify assembly, the diffs used in the RC Boy's 4WD cars feature a snap-shut diff case, which eliminates the tiny screws normally used to close the diff.

PRE-MOUNTED TIRES

One less thing to do before hitting the pavement! All the RC Boy's 4WD cars include bright chrome wheels and slick or knobby tires, depending on model.

380 MOTOR

The diminutive powerplant supplies long run times and more scoot than you might think, as the RC Boy's 4WD cars are quite light.

ELECTRONIC SPEED CONTROL

(not included) Tamiya omitted speed controls from the RC Boy's 4WD Racer Series, saving beginners from tricky mechanical linkage setups. With the wide variety of excellent, easy-to-install sport ESCs out there, it's easy to get up and running.

Tamiya's RC Boy's 4WD Racer Series vehicles are designed to make entering the wonderful world of R/C fun, easy and affordable. The vehicles share the futuristic styling of Tamiya's (non R/C) Mini 4WD cars and are extremely easy to build and race. The cars are powered by small, 380-size electric motors for easy control, and they

are designed to use an electronic speed control, which is easier to install and safer to use than a mechanical speed control.

Tamiya offers three models to choose from and will probably release more models soon. The Voltec Fighter and Thunder Blitz are open-cockpit designs with molded driver figures, and both kits include pre-assembled slick racing tires and wheels. The Wild Ceptor is a closed-cockpit design that comes with larger-diameter off-road tires and flashy, 3-spoke chrome wheels. The vehicles feature ABS plastic bodies that do not require painting, full decal sets and an ingenious body-mounting system that doesn't require body clips or body removal to change the stick-type battery pack. In addition, very few tools are needed for assembly, and the kit's most vital tool—a Tamiya box wrench—is included and is used to install all the fasteners.

A CLOSER LOOK

With the bodies off, the vehicles look a lot like the Mini 4WDs that inspired them, only much larger. The cars are 1/10 scale and—believe it or not—are modeled after a full-size racing Mini 4WD prototype that is raced at exhibitions in Japan. The cars are built around a completely sealed, shaft-driven, 4WD drive train that is similar in design to that of Tamiya's TL01 series cars. All of the drive gears are large metric pitch for added durability and include easy-to-assemble front and rear bevel-gear differentials to assist in cornering.

Simple R/C radio gear is all that's needed to get the RC Boy's 4WD Racer Series cars up and running. Tamiya doesn't include a mechanical speed control; I thought this was quite odd at first, but later I realized that ESCs are far more user-friendly and safer to operate—more suitable for first-time racers.



TAMIYA RC BOY'S 4WD RACERS

The cars do not have any sort of suspension except for the air in their tires, so they do not handle as well as the 4WD touring cars and off-road buggies you may be accustomed to, but they are quite nimble all the same. They also come equipped with giant front bumpers to protect the chassis and body components in the event of a collision, and they are designed to accept standard-size R/C gear and stick-pack batteries. Fancy electronics are not required, and the most inexpensive R/C gear will work just fine. A reversing speed control is recommended, however, so beginners will be able to back out of trouble—that's always more fun.

The RC Boy's 4WD Racer Series cars cannot be tuned in any way, although they can be hopped up for greater speed. Tamiya now offers ball bearings and a special motor mount that accepts standard 540-size motors, and the company may include additional hop-ups in the near future.

PERFORMANCE

I handed a pair of the RC Boy's cars over to the "target audience" they were designed for, as represented by my niece Nicole, 10, and nephew Anthony, 8. The RC Boy's 4WD cars took a lot of lumps as Anthony and Nicole moved through the R/C learning curve, but they soon stopped slamming into curbs (and each other) and mastered the controls. Suitably skilled, they could now slam into each other on purpose, instead of by accident! Aside from some scuffed decals, the RC Boy's cars took all the kids could dish out. Although the 380-powered cars don't provide the same miles-per-hour as the more powerful machines we experienced hobbyists are used to, my nephew and niece seemed to think they were plenty fast nonetheless, and the cars definitely provided plenty of *smiles-per-hour*. And, hey; how fast do you need to go to slam into curbs, anyway?

*Addresses are listed alphabetically in the Index of Manufacturers on page 241. ■

This is just about all there is to an RC Boy's 4WD Racer Series kit. The low parts count makes for quick, easy assembly. You don't even have to cut out the decals; they're pre-trimmed on the backing sheet!



MINI INSPIRATION

If the swoopy bodies of the RC Boy's 4WD Racer Series cars look familiar, it's probably because you've seen very similar machines in a much smaller package—Tamiya's Mini 4WD cars, to be precise. Just 6 inches long, the free-running battery-operated cars are actually one of Japan's most popular hobby segments and are supported with racing programs that are catching on here in the



U.S. (The cars run on closed courses and are significantly hopped up to increase their speed and stability—just like R/C cars.) For the young Mini 4WD enthusiast, the similar technology of the RC Boy's Racer Series cars is a natural entry to the R/C hobby. Welcome them!



Tamiya's top-of-the-line Racing Mini 4WD Japan Cup Circuit. Measuring 10 feet by 4 feet, 8 inches, this three-lane track has over 66 feet of running distance.



This Super-X
(shown above with
body) is typical of Tamiya's
Mini 4WD cars. The snap-
together chassis are quickly
assembled and the cars are
fun to play with, with or with-
out track. The same sort of hop-
ups we use in R/C (bearings, foam tires,
lightweight parts) are available for the Minis.



RACER n e w s

sponsored by **MIP** *Race With Us*

by George M. Gonzalez

GET UP TO SPEED WITH ...

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- 130** MINI RACE COVERAGE • 1998 NORRCA Off-Road Nationals

Tamiya's R/C cars have remained popular over the years because of their reliable designs and high quality—a testimony to their fine design. This month, Kiyokazu (Kiyo) Suzuki—a young R/C car designer who works at Tamiya's headquarters in Shizuoka City, Japan—is the "Innovator at Work." He shares with us some insights as well as some company secrets.

In our "Speed Shop," you'll find Traxxas' awesome new Nitro 4-Tec glow-powered touring car, which—according to Traxxas—will be the fastest ready-to-run (RTR) vehicle available. The Nitro 4-Tec boasts

speeds in excess of 50mph and is so fast that a warning label is placed on every box! You'll also find some cool new racing products from HPI and Robinson Racing.

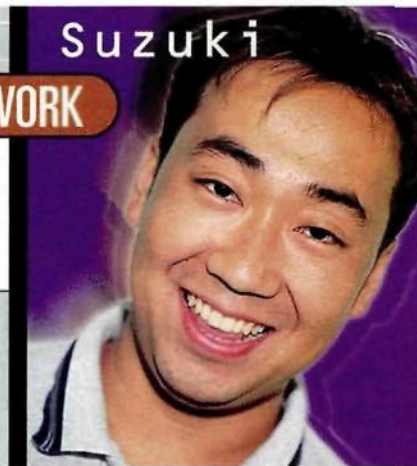
Team Yokomo/Team Maxtec factory driver Barry Baker takes the podium in our "Racer Profile" section and is also the inspiration for a special mini "How to" article on beefing up the YR4-M2's front suspension. In addition, Barry Baker's ace mechanic, Frosty St. Clair, passes along the "Racer Tip of the Month."

And finally, coverage of the NORRCA Off-Road Nationals will appease you dirt guys. Enjoy!

Kiyokazu Suzuki

INNOVATOR AT WORK

Kiyo Suzuki started his career with Tamiya at the tender age of 18, and as an accomplished 1/8-scale gas and 1/12-scale on-road racer, he contributed greatly to the development of Tamiya's TGX 1/8-scale gas on-road and M-chassis mini car lines. At 24, Kiyo has become one of the company's most talented designers; to help Tamiya design R/C cars for the U.S. market, he recently visited this country to study American racing trends. I talked with Kiyo while he was in town to visit the Tamiya America facility in Aliso Viejo, CA.



Radio Control Car Action: It's a pleasure to meet you. It's a rare opportunity to meet a designer from Tamiya. Some background questions: you started working for Tamiya at the impressively young age of 18. Were you a Tamiya R/C car enthusiast before you started to work for the company?

Kiyokazu Suzuki: Of course I was. But I was enthusiastic about all R/C cars, not just Tamiya's.

RCCA: Was it always a dream of yours to work for Tamiya, Kiyo?

KS: Yes. My dream has come true.

RCCA: How old were you when you first discovered R/C racing?

KS: I was six years old when my father and older brother took me to a circuit for the first time.

RCCA: In your opinion, is R/C racing more popular in Japan than it is here in the States?

KS: The racing held in Japan is bigger, but there are many more opportunities to hold races in the U.S.

RCCA: Is R/C racing in Japan different from here in the States? If so, what are some of the differences?

KS: People enjoy racing very much in the

U.S. I feel that most Americans race mainly for fun, while most Japanese race for their results.

RCCA: What are Tamiya's most popular cars in Japan?

KS: The TA03 series cars are most popular.

RCCA: What are your favorite racing classes?

KS: 1/12-scale electric on-road racing and 1/8-scale gas on-road racing, like the Serpent and Pico cars.

RCCA: Is 1/8-scale on-road racing popular in Japan? Does Tamiya offer a racing series like the Tamiya Championship Series [TCS] for the company's 1/8-scale TGX Mk.1? And will Tamiya ever include a racing class here in the States for the venerable TGX?

KS: The TGX is popular among Japanese R/C fans, but not as much as the 1/10-scale Tamiya touring cars. I'm not sure if we'll ever offer a racing class for the TGX in America.

RCCA: OK, let's talk a little bit about your involvement with Tamiya. I understand that you work in planning and development at the Tamiya corporate offices in Shizuoka City and that you're responsible for the development of new R/C cars and hop-ups; specifically, which products have you developed?

KS: I have been involved in TGX, FWD cars, M-chassis and hop-ups for the TGX.

RCCA: Out of curiosity, are some of the hop-up parts designed early on in the developmental stages of the car design, or are most of them the result of race-testing later on during prototyping?

KS: Both; when we designed the TA03, we also designed some of the hop-ups at the same time because racers require high performance. In the case of the TL01, we designed the car first and then tested and developed hop-up parts to improve its performance afterward.

RCCA: Does Tamiya design products that are intended for the USA market exclusively, or conversely, that are exclusively for the Japanese market?

KS: Originally, we were designing cars for the Japanese and European markets. Now we are studying and designing cars exclusively for the American market, and that's why I'm here.

Continued on next page



MIP Race With US RACER news

Continued from previous page

INNOVATOR AT WORK

RCCA: Does this mean that we'll be seeing some new products from Tamiya that are just for American racers?

KS: Yes; we are planning to introduce three new products exclusively for the U.S. market before the end of the year. One of these products is the Ford SVT F-150 Lightning, our first American truck body offered with the 4WD TLo1 chassis; the other is a new, 1/10-scale, on-road gas-powered car. The new gas touring car will be called the TG10 and will hopefully be released by December. We also have a new limited edition TAO3R that will include complete sealed ball bearings, "A"-compound reinforced slick tires and a black chassis and suspension components. It will also include a Honda NSX Mobile 1 racing body.

RCCA: What kind of research did you do here in the States? Did you get the opportunity to visit some of Southern California's hot racing spots? What have you discovered?

KS: I researched the types of R/C cars American people will need in the coming years. Yes; I visited So Cal, Hobby Masters and so on, and I found some people who were really enthusiastic about driving R/C cars. They are very serious about everything!

RCCA: What are some of the design parameters you must consider when it comes to designing new products? Do you learn from past designs, consider racer input, etc.?

KS: We have to design a product that everyone—including beginners—can build, maintain and tune up easily. I am always trying to talk with R/C fans to get their input into our new cars.

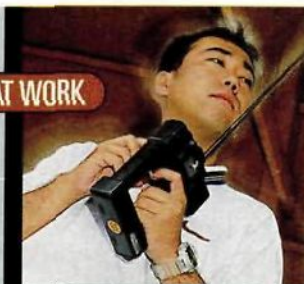
RCCA: What's it like to work for Tamiya? Can you briefly describe a typical day?

KS: A typical day for me at Tamiya Inc. is split in two; half the day I spend designing hop-up parts, and the remaining half of the day I spend test-driving new cars.

RCCA: What do you enjoy most about your career with Tamiya? Is there anything difficult about your job?

KS: I am very delighted to see cars that I designed at Tamiya making people happy. But I am very busy, and it's hard to find time to enjoy driving my own R/C cars.

RCCA: Kiyo, thank you again for the opportunity to talk with you. Keep up the good work; I wish you continued success at Tamiya.



Kiyo Suzuki takes Tamiya's new TG10 for some hot laps at Tamiya's Aliso Viejo facility.

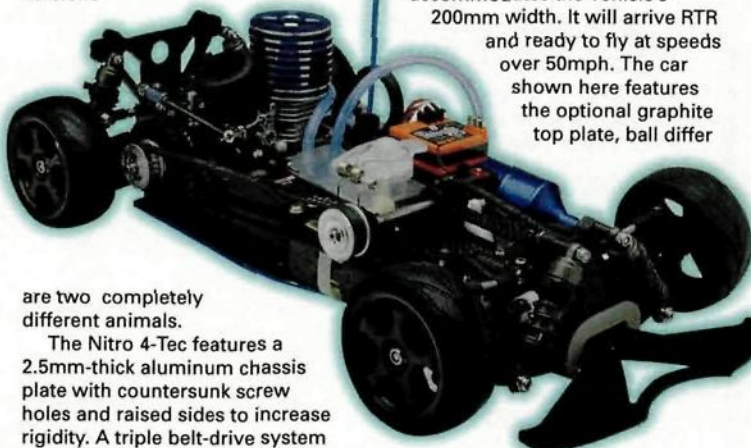
Speed Shop

A 50mph Road Rocket

At a private press conference, Traxxas* unveiled what it calls the most race-ready (and by far the fastest) vehicle ever to leave its assembly line. You're looking at the Traxxas Nitro 4-Tec, and as you can see by the photos, this car is serious! In fact, this new touring car is so formidable that Traxxas was hesitant to carry over the name "4-Tec" because the electric and nitro versions

buckles, sliding adjustable swaybar mounts, bellcrank steering, planetary gear differentials with bearing-supported shafts, and front upper and lower suspension arms with reactive caster capability.

The new car will also include a large-displacement Pro .15 engine with a large, blue-anodized heat-sink head and tuned pipe and a special touring-car body that accommodates the vehicle's 200mm width. It will arrive RTR and ready to fly at speeds over 50mph. The car shown here features the optional graphite top plate, ball differ



are two completely different animals.

The Nitro 4-Tec features a 2.5mm-thick aluminum chassis plate with countersunk screw holes and raised sides to increase rigidity. A triple belt-drive system with large, 20-tooth pulleys ensures friction-free power delivery to all four wheels and allows the fuel tank to be mounted dead center on the chassis.

The Nitro 4-Tec will also come equipped with full ball bearings, including large-diameter bearings for all four outdrives, a 2-speed tranny, Pro-Line V-Rage radial tires with foam inserts, adjustable turn-

entials and aluminum-anodized tuned pipe, all of which will be available soon.

(No pricing or part numbers were available for the Nitro 4-Tec at press time.)





Sticky Shoes and a Classy Body

HPI* has just released its Belted Racing Slick tires; they are molded from an all-new compound and are intended for top-level racing. The tires feature an inner reinforcing belt that ensures long tire life, and according to HPI, the tires have a rounded profile that concentrates the weight of the car onto a slightly smaller contact patch.

The tires are available in 26mm width (standard-narrow) and do not include foam inserts because HPI has also released its new Soft, Medium and Low Bounce foam inserts, which are a perfect match for the new slicks. The Medium compound inserts are similar to what has been included with HPI tires in the past, the Soft compound will provide a little more traction, and the Low Bounce compound will provide superior traction on permanent R/C racetracks.

Also new from HPI is this stylin' Lexus GS 400 Lexan body that's designed to fit most 190mm-width touring cars. The GS 400 body is an excellent representation of the full-scale, 4-cam, V8-powered Japanese super-tourer and probably shares many of its handling attributes. The body comes complete with a detailed decal sheet; it includes all of the car's window moldings, insignias, front grill and front and rear illumination. The body also includes a functional rear wing with separate side fins.

■ Part no. 4435

(Racing Slick Belted tire, 26mm), \$11.

■ Foam inserts

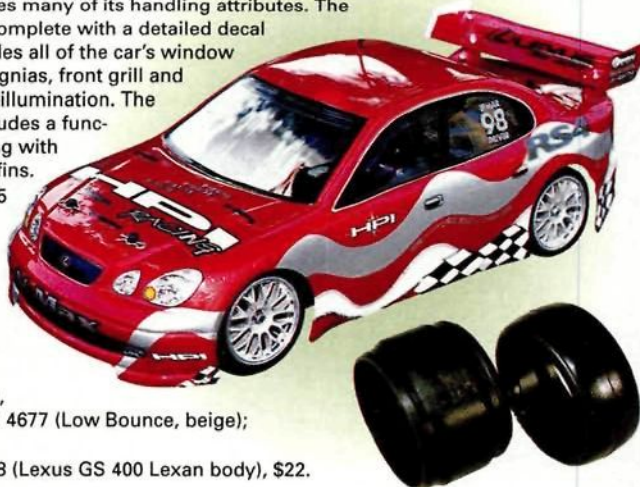
Part nos. 4675

(Soft, gray),

4676 (Medium, dark gray) and 4677 (Low Bounce, beige);

\$2.50 to \$3.

■ Part no. 7048 (Lexus GS 400 Lexan body), \$22.



Robinson Racing Goes Titanium—

New Robinson gear for HPI RS4s, Associated RC10GT



If you're looking to lighten up the drive train, expand the gearing options, or increase the tuning flexibility of your RS4-series car or Associated GT, you're in luck.

Robinson Racing Products* now offers its lightened slipper-plate kit just for the RS4 MT. In addition to the relieved plate, two slipper pads are provided; the "gold" pad is for high-bite tracks, and the "brown" pad is for looser stuff. If you have an RS4 Sport, Rally, or Pro, RRP's titanium turnbuckles can trim weight while they add strength and adjustability. Both front and rear sets feature wide flats for easy wrenching and a clearly scribed mark to indicate the left-hand thread. Titanium ball studs are also now available just for the RS4 in "short" and "long" lengths and in large diameter to fit HPI shock ends. Finally, the new RS4 Pro spur-gear adapter will bring the spur gear much closer to the motor plate; this will allow the pinion to be mounted closer to the motor can for less wobble and less shaft deflection.

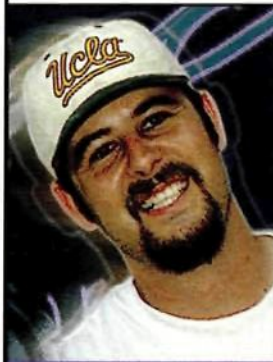
For RC10GT owners, RRP's 14-tooth clutch bell is the hot ticket for expanding gearing options. Up to now, no one has offered anything smaller than a 15-tooth because of the size of the bearing in the clutch bell; looks as if Rob Robinson has solved that one! Part no. RRP 2214 (14-tooth clutch bell for RC10GT), \$9.95; RRP 1521 (lightened slipper-pad set for RS4MT), \$16.50.

■ For HPI RS4

Part no. RRP 1522 (titanium ball studs), \$7.95; RRP 1523 (titanium ball studs, long), \$7.95; RRP 1525 (titanium tie rods, front), \$5.50; RRP 1526 (titanium tie rods, rear), \$5.50.

RACER PROFILE

BARRY BAKER



Look familiar? Barry Baker is a Team Yokomo/Team Maxtec factory driver who competes in just about every racing event. Two-wheel-drive off-road, 1/12-scale on-road, touring-car racing, it doesn't matter; it's all in a day's work. Barry is also active with Yokomo R&D and is frequently spotted with hot prototype machines.

I caught up with Barry near So Cal Raceway in Huntington Beach, CA; here's what he had to say.

VITAL SIGNS

Age: 28

Sponsors: Yokomo, Maxtec, LRP, Associated, Pro-Line, Protoform, Jaco, Airtronics, Team Suzuki, MIP, O'Donnell, Savon Hobbies, So Cal Raceway, 'N Style Clothing

Years racing: 11

Favorite racing class: 1/10-scale sedan

Hometown: Huntington Beach, CA

First R/C car: Tamiya Frog

Favorite track: Las Vegas Silver Bowl

Major victories: '98 ROAR 1/10-scale Gas Sedan National Champion, '94 NORRCA 1/10-scale On-Road Modified National Champion, '95 Japanese 1/10-scale On-Road National Champion, '96 IFMAR 1/12- and 1/10-scale Worlds A-main finalist, '97 NORRCA Sedan National Champion, '98 IFMAR 1/10-scale On-Road Worlds A-main finalist and ISTC World Cup top 10 finisher

Radio Control Car Action: Thanks for your time, Barry. You're an established factory team pilot who has a long history of success at the track. What makes you so fast? Barry Baker: Thanks for the interview, George. I think I'm fast because I enjoy racing R/C cars, and when I enjoy something, I put all my effort into it. As you can imagine, I do a lot of testing and practicing.

RCRA: I'm curious; how did you first become involved in R/C racing?

BB: It all started when I lived in San Diego and used to ride skateboards at the Ranch Skate Shop in Del Mar. There was an R/C track there, and I thought I would like to try out R/C. One day, I was at the Price Club with my mom and saw a Tamiya Frog kit on display; it came complete with radio and charger. I ended up buying the kit and raced it on the very next day. That's how I started.

RCRA: You started out racing a Tamiya Frog and actually won races with it?

BB: Yes; I won the very first race I entered. Boy, was I hooked after that!

RCRA: Which type of R/C car did you race after your Frog, and how did you do with that vehicle?

BB: After my Frog, I purchased an Associated RC10. I

Continued on next page



RACER news

RACER PROFILE

Continued from previous page

raced it completely stock in the dirt-oval class. Then a man named Alan Kentner, who built dirt-oval cars, converted my RC10 into a dirt-oval car, and I started to improve. I would win two or three times a month with that car in the stock class.

RCCA: How long did it take you to realize that you had talent, and how long was it before motor, battery and car manufacturers noticed your talent and offered you sponsorships?

BB: I would say it was about three months after I started racing. There was a buzz around the track about this fast, new racer; I was shocked when I found out they were talking about me.

RCCA: What was your first big win?

BB: It was in 1988. There was this big sprint-car race in Del Mar. All the fastest sprint-car drivers were there; they raced stock cars on Saturday and modified cars on Sunday. I qualified second behind Jimmy Gouge, who was the sprint-car king at that time. It was a battle during the Mains, but I ended up passing "the king" on the last turn to win the race; what a thrill.

RCCA: Has your relationship with Yokomo and Maxtec taken you to a higher level of competitiveness?

BB: I would say that if not for Yokomo and Maxtec, we probably wouldn't be talking right now. They have given me the opportunity to expand my horizons in racing, and I could never thank them enough for the opportunities they've given me. Of course, I'm very thankful to all my previous sponsors as well; they know who they are.

RCCA: Forgive me for asking this question, Barry, but it might be good to clear the air; at one time in your racing career, you had a bit of a reputation for conducting yourself in an unsportsmanlike manner at races, and you've been given warnings and penalties for those actions. Most of the penalties were for rough driving and "mouthing off" to race officials or other drivers. I have never seen you yell at officials or other drivers, but I have seen you make some passes that were pretty bold. Are you an extremely aggressive driver, or is it that sometimes, things just happen in racing that are out your control?

BB: Well, this is a sticky situation. I am a very competitive person, and I race to win. When I don't win, I get mad—I think most racers do—although some racers are unaffected when they don't do as well as they could.

I guess I'm known for wearing my emotions on my sleeve. I've been working on controlling my emotions lately, and I sincerely hope that everyone will notice a change in me. The friends I hang out with know that I'm a totally different person when I'm not racing; I like to have fun. That's what's life is all about, right?

Now, about my aggressive driving. Most of these so-called "bold passes" are just racing incidents. As I said before, I always try to win, but so does everyone else. I've seen other drivers make bold moves

that have gone undetected, but for some reason, I'm always the one who gets blamed because of my rocky past. I think that in the near future, people will notice a change in me and will forget the past. I hope so, anyway.

RCCA: I understand that you're now working in research and development at Yokomo USA. What do you do there?

BB: I do a lot of testing of new parts, cars and anything else that needs to be tested, and I provide feedback info to Yokomo in Japan. From that point, the products are developed. I'm also part of Yokomo's tech support here at our U.S. headquarters, and anyone can call me for advice—about R/C cars, that is!

RCCA: Now that I'm based on the West Coast again, I've been racing a lot at So Cal. Every time I go to the track, I see you there. Are you usually practicing, or are you trying out new products and/or setups?

BB: Most of the time, I'm testing, but sometimes, I go to practice so I can remain as fast as possible. Most people only buy the products that win, so club races are important.

RCCA: What do you like to do when you're not working or racing?

BB: I didn't know I could do anything except race. Is there another life I don't know about? Just kidding. I like to hang out with my friends, shoot pool, and I love to play golf.

RCCA: What are some of your short- and long-term goals?

BB: Short term, maybe to win a world championship or two in any class; long term, to be recognized as one of the best racers in the world.

RCCA: I think you've already achieved your long-term goal, Barry. So how do you plan to take R/C racing to the next level?

BB: I think that R/C racing will continue to progress as new technologies are introduced, but what I would really like to do is to become more like someone whom I've always had a great deal of respect for. I may not have ever told him this before, but I guess he will know now: that person is Team Associated's very own Cliff Lett... a great racer, a great designer and a great person. I think that's the level I'm going to shoot for.

RCCA: Wow; that's a really nice tribute, Barry. Is there anyone else you'd like to acknowledge, now that you have the podium?

BB: Yes, as a matter of fact; I would like to thank my parents, Candi and Mike Baker, and I would also like to thank you, George, and everyone at R/C Car Action who made this possible; you guys are the best!

RCCA: Thanks again for your time, Barry. We wish you continued success in all your racing endeavors and hope you win that world championship title soon. See you at So Cal.

RACER TIP OF THE MONTH

Frosty St. Clair
Team Yokomo driver/mechanic

You may notice a slight chatter in the front end of your Yokomo YR4-M2 when you run it on high-bite tracks. You can solve this slight ailment by applying a heavy grease to the inside of the front outdrives. The grease greatly reduces any friction between the outdrives and the universal drive shafts, and this corrects the problem.



RACER news

HOW TO

Stiffen up the YR4-M2's Front Suspension by Adding Torque Rods

Here's an inexpensive modification that will make your Yokomo* YR4-M2's front suspension much more rigid. If you install torque rods from the caster blocks to the graphite upper deck, the car's front suspension will not flex, and this in turn will provide more consistent handling when you race with modified motors.

It is important to know, however, that once you install the torque rods onto the chassis, you'll lose the ability to adjust the coil-spring shock that's mounted to the upper deck. This is not a problem, since most of Yokomo's team drivers install braces on their cars to bridge the gap between the steering bellcranks and the front bulkhead, and this ultimately eliminates the coil spring's adjustability as well. Here's how it's done.

WHAT YOU'LL NEED

To complete the modification, you'll need the following items, all of which should be readily available at your local hobby shop. You might even have everything you need right in your toolbox!

- Team Losi standard-length ball cups (total of four).
- Tie rods; 2-inch length, preferably titanium (total of two).
- 4-40-size nylon locknuts (total of four).
- Team Associated ball joints (four total: two long and two short).



STEP 1

Remove the caster blocks from the vehicle. With a sharp hobby knife, make small pilot holes in the exact center of the molded tabs on each caster block. Next, with a $\frac{7}{64}$ -inch drill bit, drill a small ball-joint mounting hole as shown in the photo.

STEP 2

Thread a long ball joint into each caster block as shown, and secure it on the bottom with a 4-40 nylon locknut. You can now reinstall the caster blocks on the car, but make sure that the left caster block goes on the left side of the car and the right caster block goes on the right side.

STEP 3

Remove the upper deck from the car, then remove the coil-spring shock from the upper deck. Next, place a strip of masking tape across the upper plate (as shown) to make a template. Make two crosses to indicate where you'll need to drill. Each cross should be $1\frac{1}{4}$ inches from the front portion of the upper deck and $\frac{7}{8}$ inch from each side of the upper deck.

STEP 4

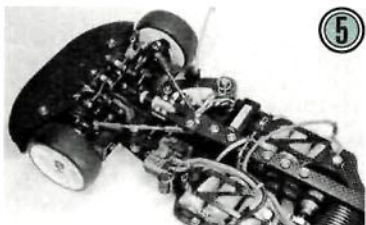
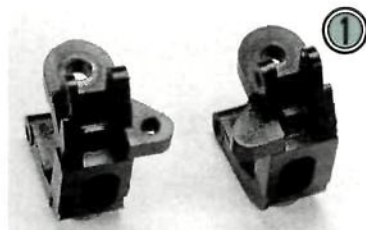
Make a small pilot hole on each cross with a hobby knife before you drill the ball joint mounting holes on the upper deck with the $\frac{7}{64}$ -inch drill bit.

Next, install the short ball joints on the upper deck (as shown) and secure the ends with a 4-40 nylon locknut.

STEP 5

Reinstall the coil-spring shock on the upper deck, and reinstall the upper deck on the chassis with the ball joints underneath the upper deck (the nylon locknuts go on top of the upper deck). Next, thread the ball cups onto the tie rods, and make sure that each tie rod ends up 3 inches long. The last step is to install the torque rods on the ball joints on both sides of the chassis as shown.

Once the torque rods have been installed on the chassis, you'll need to adjust their length to ensure that they do not bind the front suspension; if the rods are too short or too long, they will cause the suspension to bind. Remove the front shocks and front tires from the car so you'll be able to see whether the suspension arms pivot freely and drop under their own weight. You'll know when the torque rods have been adjusted properly; you'll be able to rock the tie rod's ball cups back and forth freely on the ball joints, and the front suspension arms will pivot smoothly and drop under their own weight without any binding. To achieve optimum results, you may need to make a few adjustments to the length of the torque rods.



HOW DOES IT FEEL?

On the track, I noticed that this modification does indeed make the car feel more consistent, but I also noticed that the car felt a bit more responsive as well. I did need to dial in a little more steering, though, and I did so by slightly increasing the servo throw with the steering dual-rate adjustment on my transmitter. I later removed the torque rods and took the car for a drive to see if I'd notice any difference. I was amazed; I needed to take away the steering I had programmed in earlier on, and the car just didn't seem as dialed. After two laps, I went back to my pit table and reinstalled the torque rods.





RACERnews

NORRCA

by Greg Vogel

NORRCA Off-Road Electric Nationals

From the first moment I set foot in the door at K&M Raceway in New Caney, TX, I knew I was about to see an exciting weekend of racing. Sure enough, the drivers, sponsors and track members proved that my instincts were correct. More than 100 racers packed into the massive, indoor facility and filled the heat board with more names than on my last year's Christmas list. All of the top drivers were there: Brian Kinwald, Mark Pavidis, the Francis brothers, Billy Easton and more. Under NORRCA rules, these big-name, factory-sponsored drivers were put into a separate Factory class. The second classification was Expert, in which partially sponsored and veteran drivers ran. For the remaining drivers, a Sportsman class was also offered in each division. Here's how the Factory racing division went.

A-MAIN OVERVIEW

• **Factory Truck.** The Factory drivers are always spectacular to watch. In the first A-main round, Brian Kinwald shot off to the early lead and never looked back. Mark Francis claimed second from the beginning as well. On the other hand, third was occupied variously by familiar names such as Hohwart, Dunbar and Hodge; when the finish tone sounded, though, Todd Hodge claimed third.

In the second A-main, it was clear that Brian Kinwald had made up his mind to win the championship, as he took off with the top slot. Rick Hohwart fell into second, with Scott Hughes close by in third. Hughes put the pressure on in the closing laps, as he posted some of the race's fastest lap times, but Hohwart was able to hold him off and keep second.

At some point during each race he was in, Brian Dunbar saw first place but couldn't make it stick; in the last round of Truck, it appeared he wasn't going to let anyone take it away. Dunbar

pulled out to the front from the beginning and held on tight. Second and third were up for grabs with Mark Francis, Todd Hodge and Rick Hohwart all within range to fill the spots. It wasn't until the final minute that the drivers finally settled into the remaining positions. Todd Hodge slid into second, and Mark Francis took third. The points tally put Brian Kinwald as the champion in first, Mark Francis in second and Todd Hodge in third.

• **Factory 2WD.** From the top qualifier position, Brian Kinwald took off as number one, with Rick Hohwart falling in behind. This is where the two drivers remained until the finish, with Brian pulling away to give himself a commanding lead over Rick. The third spot, however, wasn't decided until the last minute, when Scott Hughes put the power down to gain the position when the buzzer sounded.

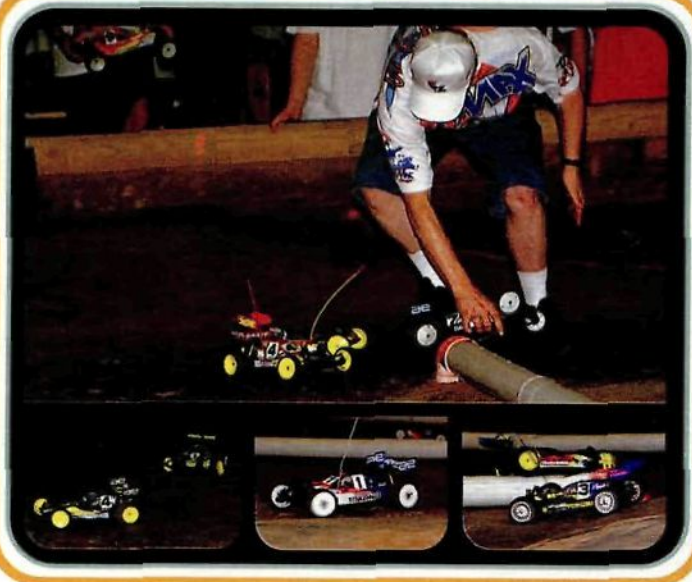
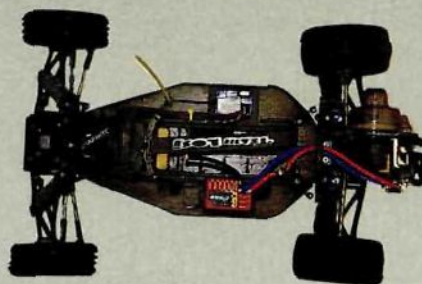
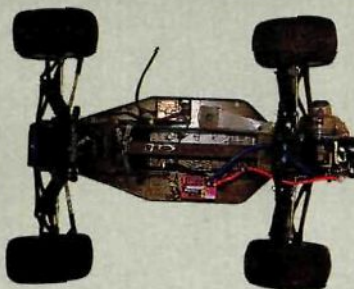


PHOTO CREDIT: GREG VOGEL

w i n n e r s



Brian Kinwald's A-main-winning XX 'CR' buggy. Brian again exhibited awesome driving skills to take the win.



Brian Kinwald's XX-T 'CR,' also a winner of the exclusive A-main. The truck was hooked up with slick tires.



Rick Hohwart of Peak Performance took the A-main win in the Factory 4WD class.



Factory 2WD A-main drivers.



Factory 4WD A-main drivers.



Factory Truck A-main drivers.

Brian Kinwald did it all over again in the second A-main, as he took off to a commanding lead and held it. The second and third positions were also locked up, with Jimmy Jacobson in the second position and Rick Hohwart occupying the third slot.

Since Kinwald had the title in his hands, he sat out the third round. The lead was held by Brian Dunbar in the beginning, but it was swapped among several drivers in the middle of the race. As the sounding of the 3-minute tone neared, Mark Pavidis put his car in the number-one slot, Mark Francis settled into second, and Dunbar placed his car in third. At the buzzer, they crossed the line in that order.

After the points had been assessed for the drivers' places, Brian Kinwald was champion, with Rick Hohwart in second and Mark Pavidis in third.

• **Factory 4WD.** From the tone, Hohwart buried the trigger in the back of the radio and took the lead. A few accidents behind him allowed Rick to pull out to a commanding lead. It didn't last long, though; Dunbar slammed the trigger harder, pulled up and passed Hohwart. A few more bobbles allowed JR Mitch to see his way clear to the lead. But Hohwart wasn't satisfied with being behind and soon regained first. JR fell into second and Brian

Dunbar held on to third.

The second round started off as a swap-fest, as many of the drivers made mistakes over jumps and stuffed their cars into the pipes, but as the race progressed, they cleaned up their acts, settled down and showed off their skills. Scott Brown found himself up front by the narrowest of margins, with second through fourth all too close behind. Brown crossed the line first, followed by

Chris Bing's car which, despite a broken suspension arm, was able to stay ahead of JR Mitch, who finished third.

Following a restart, Rick Hohwart put himself into first just a few laps into the third round. An anxious Chris Bing and JR Mitch held close to his rear bumper, but the two followers didn't hold up for long, as Brian Kinwald made some passes and jumped into second. This was also an opportunity for Brian Dunbar to sneak his way up through the pack; he passed Bing and Mitch to hold on to third. Hohwart took the championship, with Mitch as runner-up and Dunbar finishing third overall.

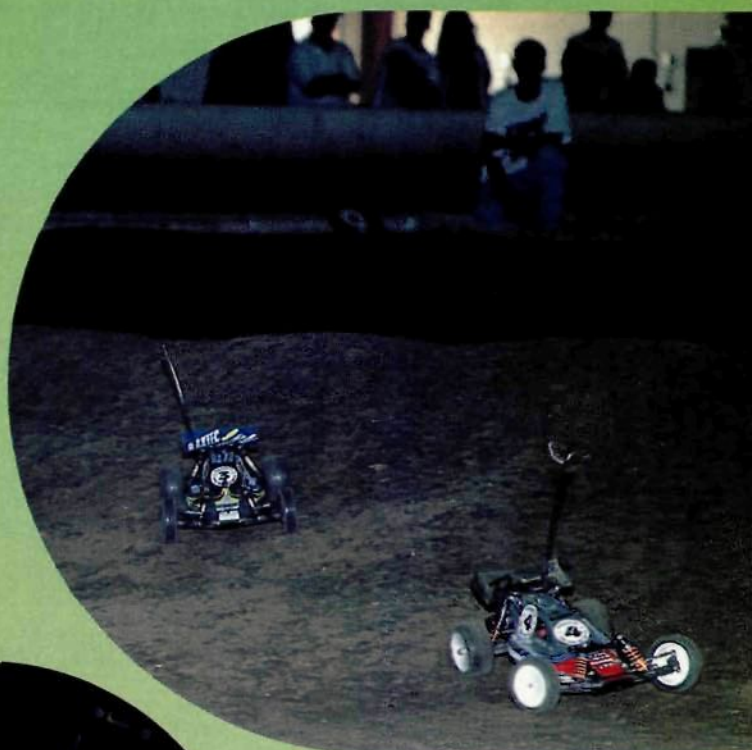
FINAL THOUGHTS

Topnotch tracks, facilities and participants always make for an excellent and exciting race; the 1998 NORCA Off-Road Nationals was no exception. I've heard that the owner has big plans for this track in the upcoming year; who knows? Maybe it will host another event of this caliber next year. Congratulations to the 1998 NORCA Champions, Brian Kinwald and Rick Hohwart, as well as to the rest of the winners in the Expert and Sportsman divisions.

*Addresses are listed alphabetically in the Index of Manufacturers on page 241.

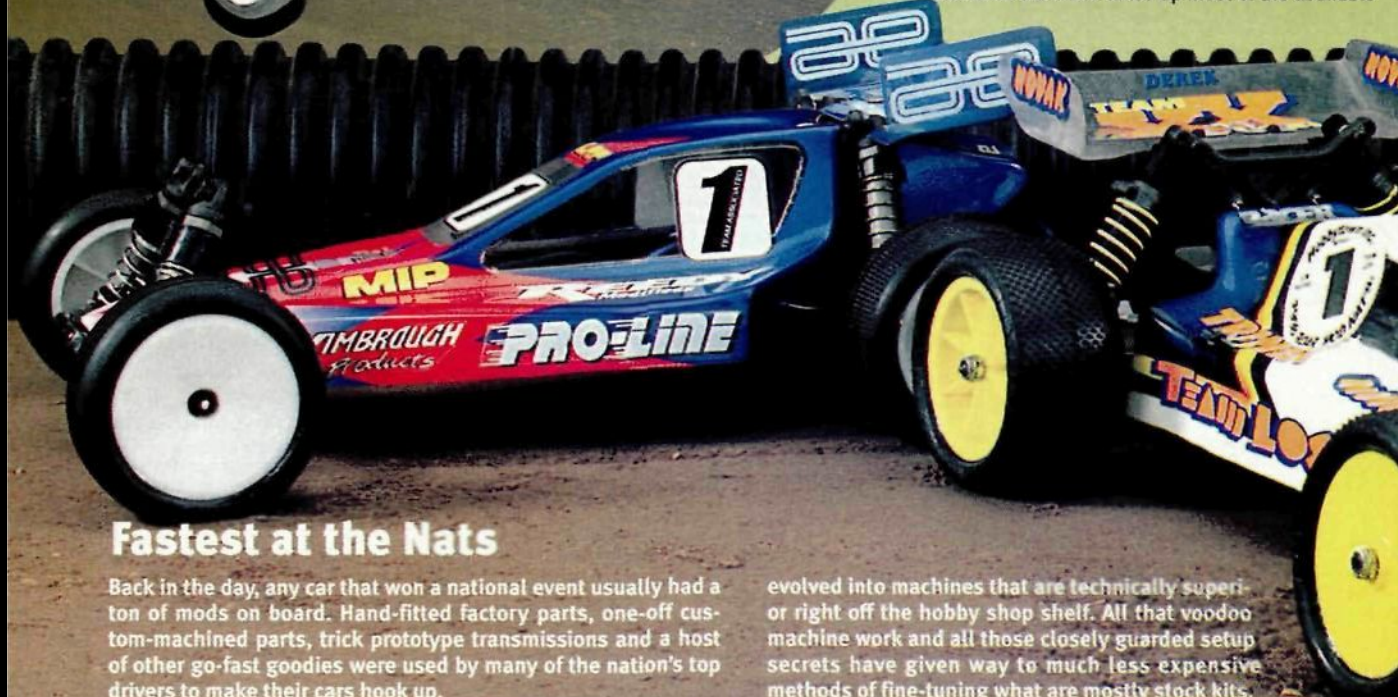
EXPERT													
	FIN.	QUAL.	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	BODY	TIRES(F/R)	TRACTION	ADDITIVE	PINION/SPUR
2WD Mod	1	3	Rob Schaffer	Losi XX 'CR'	Peak 13 Dbl.	Peak	Tekin	NA	Losi	Losi	NA		25/82
	2	4	Jordan Musser	Losi XX 'CR'	Velocity Racing	SMC Sup-2000	Tekin G-10	Airtronics 3PS	Losi	Losi Silver Ribs/M3 Squares	None		19/81
	3	1	Randon Hayes	Associated B3	Reedy 10x4	Reedy 2000	LRP V6	KO Precious	Associated	Pro-Line M2/Pro-Line M3	Rat Wexx		18/81
4WD Mod	1	1	Jordan Musser	Losi XX-4	Velocity Racing	SMC Sup-2000	Tekin G-10	Airtronics 3PS	Losi	Losi Sprint	None		18/84
	2	2	Bill Bridges	Losi XX-4	Fantom 11x2	Perfect Match	Novak Cyclone	Airtronics 3PS	Losi	Losi Blackhead Slick/Losi Sprint Slick	Fantom		18/84
	3	4	Adam Drake	Losi XX-4	Race Prep 11x2	GM VIS	Novak Cyclone	NA	Losi	Losi Sprint Silver	Race Prep		19/86
Truck Mod	1	1	Brain Handwork	Associated T3	GM 12-2	GM VIS	GM V12	Airtronics 3PS	Associated	Pro-Line	Associated		19/87
	2	4	Adam Drake	Losi XX-T 'CR'	Race Prep 11x2	GM VIS	Novak Cyclone	NA	Losi	Losi Slicks	Race Prep		19/88
	3	5	David Joor	Losi XX-T-G Plus	Trinity D3 12 Triple	Trinity Team Edt.	Novak Cyclone	Airtronics	Losi	Losi	Trinity Zip Grip Free		21/88
2WD Stock	1	1	Jordan Musser	Losi XX 'CR'	Velocity Racing	SMC Sup-2000	Tekin G-10	Airtronics 3PS	Losi	Losi Silver Ribs/Pro-Line M3 Square	None		23/84
	2	3	Rob Schaffer	Losi XX 'CR'	Peak	Peak	Tekin	NA	Losi	Losi	NA		25/82
	3	2	Daniel Calcote	Associated B3	Bennet	World Class 2000	LRP V6	Airtronics M8	Associated	Pro-Line M3 Slick/Pro-Line M2 Slick	Trinity Zip Grip		24/81
Truck Stock	1	1	Ryan Dawson	Losi XX-T 'CR'	Peak	Peak Powerflo	Tekin G12	Airtronics 3PS	Losi	Losi Sprint/Losi T-2000	NA		20/84
	2	2	Kurt Wenger	Associated T3	NA	Xipp RC2000	LRP V6	Airtronics CS2P	Associated	Pro-Line Holedshot	NA		19/87
	3	6	Ronnie Norris	Associated T3	Reedy	Reedy Zappers	LRP IPC V6	Futaba 3PJ	Associated	Pro-Line M3 Edge/M3 Square Fuzzie	None		20/87
FACTORY													
2WD Mod	1	1	Brian Kinwald	Losi XX 'CR'	Trinity 13x6	Trinity	Novak Cyclone	Airtronics	Losi	Losi	Zip Grip		20/82
	2	6	Rick Hohwart	Losi XX 'CR'	Peak 12D	Peak Powerflo	Novak Cyclone	Futaba 3PJ	Losi	Losi Widebody/Losi Taper Pin	NA		20/84
	3	9	Mark Pavidis	Associated B3	Reedy 10x4	Reedy Zapper	LRP IPC	Airtronics M8	Pro-Line	Pro-Line Rib/Pro-Line Square Fuzzies	NA		18/81
4WD Mod	1	1	Rick Hohwart	Losi XX-4	Peak 11D	Peak Powerflo	Novak Cyclone	Futaba 3PJ	Losi	Losi Sprint	NA		18/84
	2	5	J.R. Mitch	Schumacher CAT 98	Reedy 10x2	Reedy 2000	LRP V6	Airtronics M8	Schumacher	Pro-Line M3	NA		18/86
	3	2	Scott Brown	Losi XX-4	Trinity 12x5	Trinity	Novak Cyclone	JR R-1	Losi XX4	Losi Sprint/Silver	Zip Grip Free		19/84
Truck Mod	1	1	Brian Kinwald	Losi XX-T 'CR'	Trinity 11x2	Trinity	Novak Cyclone	Airtronics	Losi	Losi	Zip Grip		18/87
	2	4	Mark Francis	Losi XX-T Graphite Plus	Trinity 12x2	Trinity Ex-Tech	Novak Cyclone	Airtronics	Losi	Losi Silver Sprint	Trinity Zip Grip		19/88
	3	8	Todd Hodge	Associated T3	GM Racing 12x3	GM VIS 2000	GM X-5	Airtronics	Associated	Pro-Line Holedshot M3	Hodge Grip		19/87

ROAR MOD NATS



THE 1998 ROAR Modified Nationals took place at the very popular HobbyTown Raceway in Lake in the Hills, IL, about 50 miles from downtown Chicago. This was the largest Modified Nationals in recent years, with 450 entries—50 more than are normally allowed!

HobbyTown Raceway, owned and operated by the Hollingsworths, is an indoor facility that features a large, well-stocked hobby shop and a very challenging, hard-packed racing surface. Because the track takes up most of the available



Fastest at the Nats

Back in the day, any car that won a national event usually had a ton of mods on board. Hand-fitted factory parts, one-off custom-machined parts, trick prototype transmissions and a host of other go-fast goodies were used by many of the nation's top drivers to make their cars hook up.

Modern-day racing machines are far different; they've

evolved into machines that are technically superior or right off the hobby shop shelf. All that voodoo machine work and all those closely guarded setup secrets have given way to much less expensive methods of fine-tuning what are mostly stock kits.

Although it's much easier to tune modern-day

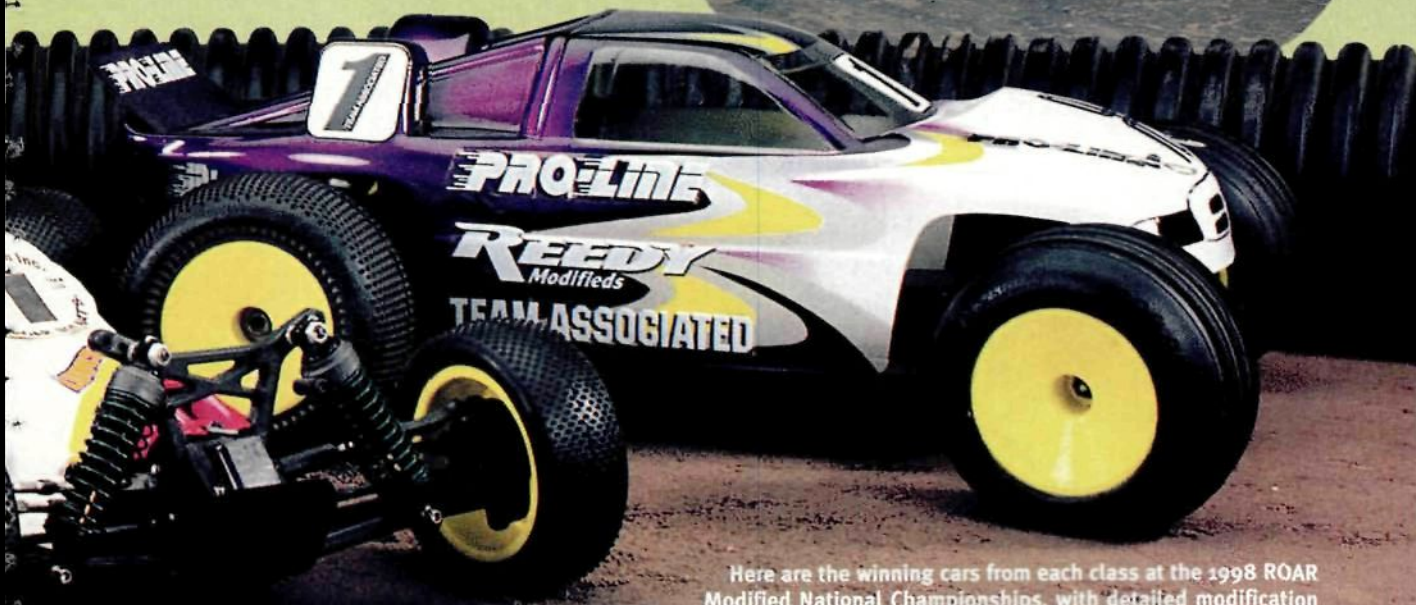


Modified mayhem strikes the Midwest

by Steve Pond

indoor space and there weren't nearly enough pits available trackside for all the participants, the pits were set up outside under a massive, circus-type tent.

The track features major elevation changes, tight technical sections, big jumps, deep dips and a very fast back straightaway. The surface was slicker than the average hard-packed indoor track, and this caused many racers to scramble all weekend to find the setup that would provide the most traction for the massive factory horsepower put down by the large field of team drivers.



racing machines, the difference is in the details. Camber angles, shock pistons, shims, springs and countless other details (driving skills notwithstanding) are what separate a national champion from the "also-rans."

Here are the winning cars from each class at the 1998 ROAR Modified National Championships, with detailed modification and setup information on the following pages. We hope this info will help those of you who run the same machines get your cars more dialed in, and eventually, into the pages of *R/C Car Action* as future Nationals winners!

ROAR MOD NATS

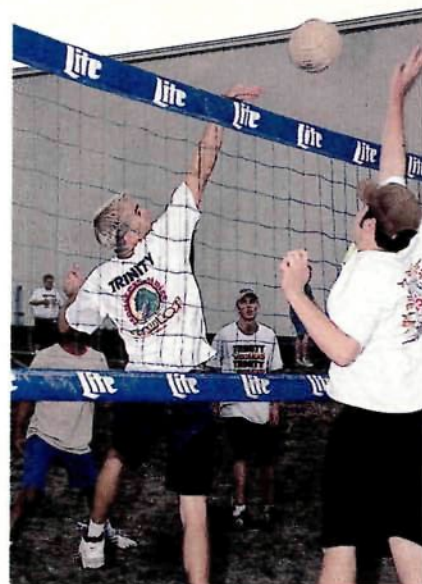
Racing followed the standard ROAR format of four rounds of qualifying using a points system; the two best rounds determined the grid for the Mains. The A-mains were run in a triple format, while the lower Mains ran single heats.

Driving his Reedy-powered Associated B3, Mark Pavidis bounced back from a dismal 12th overall in the first round to score first place in the second and fourth rounds; he took the TQ spot for the A-main in 2WD Mod. His best time was 14 laps in 4:09.11. Mark was followed by Scott Hughes—also running a Reedy-powered B3—with second- and first-place finishes in the second and third rounds, respectively. In third was the ever-present Brian Kinwald running a Trinity-powered Losi XX 'CR.' Brian scored first- and second-place finishes

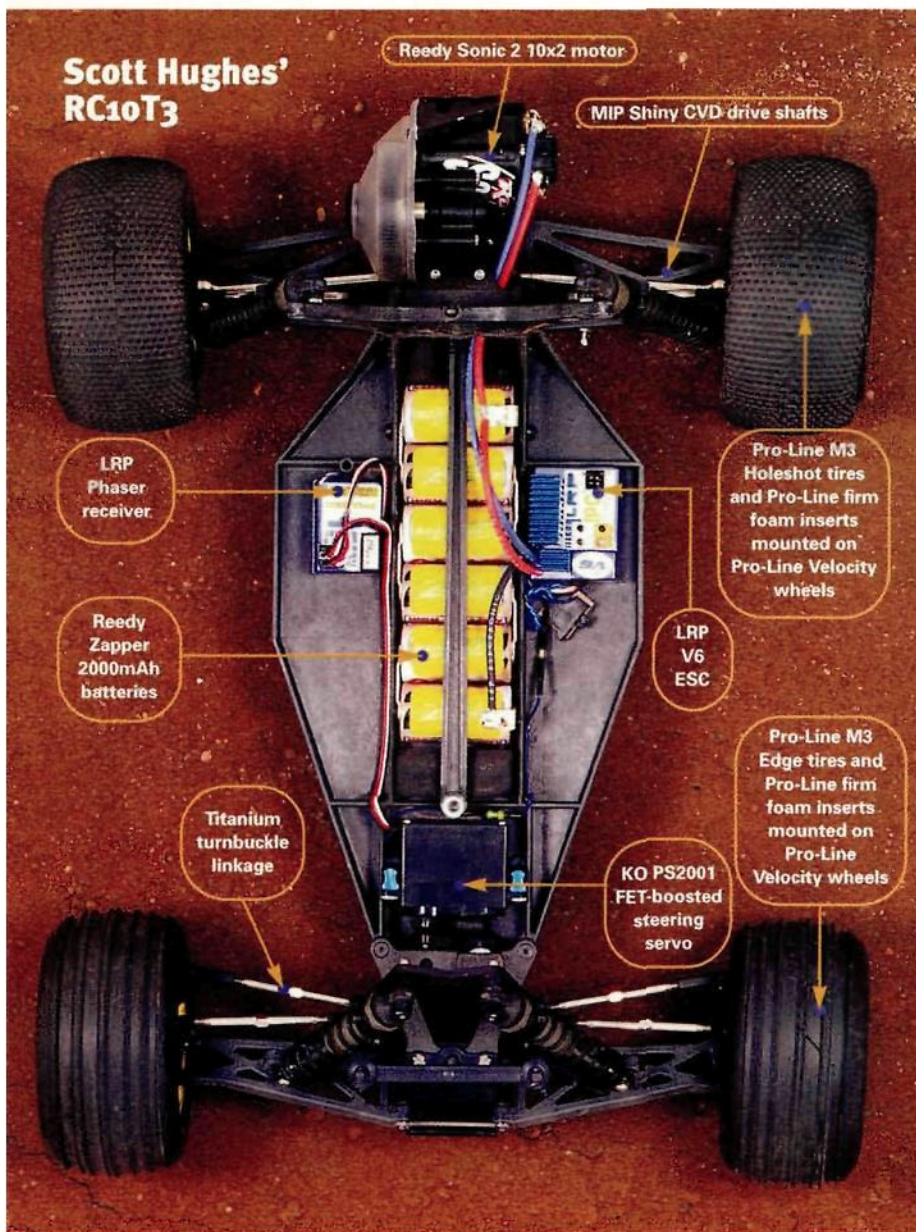
in the first and third rounds, but his finishing times weren't fast enough to pass Hughes.

The Truck Mod class saw Scott Hughes turn the tables on Mark Pavidis with a pair of first-place efforts in the first and third rounds; his best effort was 14 laps in 4:08.18, which put his Reedy-powered T3 at the front of the grid. Pavidis wasn't looking too good for the A-main with a fourth, a 39th and a DNS in the first three rounds. He managed to gather it

Team Trinity/Losi driver Matt Francis drills a shot past Team Associated's defense during a friendly "best two-out-of-three" volleyball match. For the record, the Trinity/Losi and company team came from behind to win this competition.



Scott Hughes' RC10T3



Reedy Sonic 2 10x2 motor

MIP Shiny CVD drive shafts

LRP Phaser receiver

Reedy Zapper 2000mAh batteries

Titanium turnbuckle linkage

LRP V6 ESC

KO PS2001 FET-boosted steering servo

Pro-Line M3 Holeshot tires and Pro-Line firm foam inserts mounted on Pro-Line Velocity wheels

Pro-Line M3 Edge tires and Pro-Line firm foam inserts mounted on Pro-Line Velocity wheels

Front Suspension

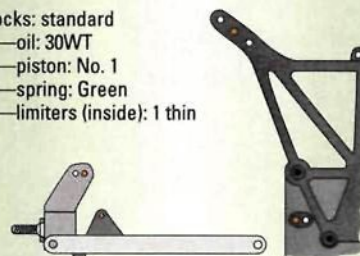
Block carrier (caster setting): 30°
Ride height: below level
Camber: 0°
Toe-in/out: 4° toe-in
Shocks: standard
—oil: 35WT
—piston: No. 2
—spring: Green
—limiters (inside): 1 thin



Rear Suspension

Suspension mounts: 3°
Rear ride height: CVD below level
Anti-squat: 3°
Camber: 0°
Rear-wheel hub placement: front

Shocks: standard
—oil: 30WT
—piston: No. 1
—spring: Green
—limiters (inside): 1 thin



Other

Tires (F/R): foam (firm) Pro-Line Edge M3/foam (firm)
Pro-Line Holeshot M3
Front wheels: one-piece
Chassis: extra-long

Motor, Transmission and Electrical

Motor: Reedy 10x2
Pinion/spur gears: 17/87
Drive shafts: CVD
Slipper: standard
Battery type/placement: Reedy/middle
Radio: KO Propo
Speed control: LRP IPC V6
Servo: KO Propo
Body: Pro-Line Dodge

up for the fourth round, though, and piloted his Reedy-powered T3 to first, clinching the second berth for the big show. Brian Kinwald repeated his efforts in Truck, scoring a second and a third in the same rounds with his Trinity-powered XX-T 'CR.'

Four-wheel-drive was the last of the three classes to complete its qualifying. Scott Brown and Brian Kinwald, both driving Trinity-powered Losi XX-4s, scored first- and second-place finishes. Kinwald ran the quicker round with his only 15-lap effort in 4:15.23, but Brown managed to put down two 15-lap runs and took the TQ spot by a narrow margin. Kinwald had to settle for the second spot on the grid, with Pavidis and his Reedy-powered Yokomo MX-4 filling third.

MAINS

Pavidis dominated 2WD with a pair of victories in the first and second Mains. He led both Mains wire to wire and by the second round, had locked up the 2WD national championship. The battle for second place overall was much closer; Brian Kinwald and Matt Francis each took a second and a third. The remaining two podium spots would not be determined until the final round.

In the final 2WD Main, Scott Hughes led the first couple of laps then surrendered the lead to Dustin Brewer, who held it for the next four. After clearing

some traffic tangles, the hard-driving Kinwald made his way up from fourth to first by lap seven, and then he never looked back. Meanwhile, the best Francis



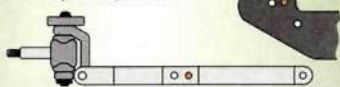
The pit area provided ample space for the most entries ever seen at a modified national event.

Front Suspension

Block carrier (caster setting): 25°
Ride height: arms level
Steering block: standard
Camber: -2°
Anti-roll bar: none
Toe-in/out: 0.5° toe-out

Shocks: standard

- oil: 35WT
- piston: Prototype 3-hole
- body: .89 in.
- shaft: .71 in.
- spring: Silver
- limiters (inside): 1 thin

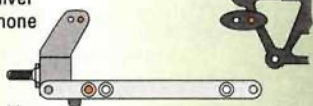


Rear Suspension

Suspension mounts: 3° toe-in/3° anti-squat
Ride height: standard
Anti-squat: washer under front
Camber: -2°
Anti-roll bar: none
Rear-wheel hub placement: standard

Shocks: standard

- oil: 25WT
- piston: Prototype 3-hole
- spring: Silver
- limiters: none



Other

Tires (F/R): Pro-Line
M3 Ribbed Foam/Pro-Line M3 Square Fuzzie Foam
Front wheels: Pro-Line wide
Chassis: standard

Motor, Transmission and Electrical

Motor: Reedy 12x2
Pinion/spur gear: 19/81
Drive shafts: Shiny CVDs
Slipper: standard
Battery type/placement: 6-cell/middle
Radio: Airtronics M8
Speed control: LRP V6
Servo: 94257

Factory Team blue-anodized motor-mounting plate/front kick-up plate/rear chassis plate

MIP Shiny CVDs

Reedy Sonic 2 12x2 motor

Mark Pavidis' RC10B3

Pro-Line M3 Square Fuzzie rear tires with Pro-Line foam inserts mounted on Pro-Line Velocity wheels

LRP IPC V6 speed control

Jammin' J graphite battery hold-down

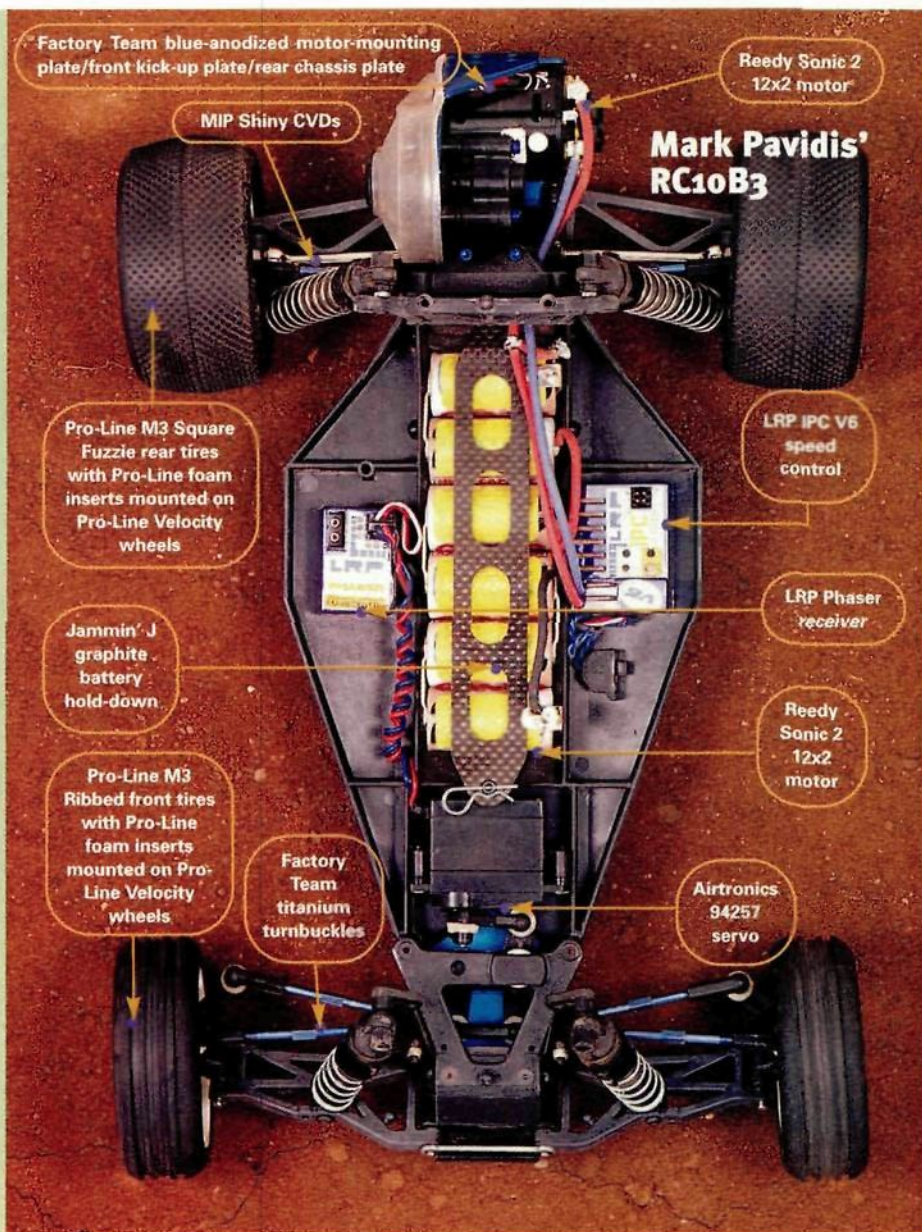
LRP Phaser receiver

Pro-Line M3 Ribbed front tires with Pro-Line foam inserts mounted on Pro-Line Velocity wheels

Reedy Sonic 2 12x2 motor

Factory Team titanium turnbuckles

Airtronics 94257 servo



ROAR MOD NATS

could muster was fifth. Kinwald locked up second, and despite a fifth in the last round, Matt Francis clinched the third spot overall.

The Truck class was more hotly contested than the 2WD class; all three rounds were required to determine the overall winner. In the first heat, Scott Hughes took off like a scalded cat and never relinquished the lead. His first-round effort was the fastest of the week-end: 14 laps in 4:04.74. The next closest finisher was Brian Kinwald, 5½ seconds behind. He was followed across the line 3 seconds later by the 2WD national champion, Mark Pavidis.

Hughes got the jump in the second round, followed by Pavidis and Kinwald, and he held on to the lead until halfway

through the 10th lap; then Kinwald, who had already gone around Pavidis, made a beautiful pass to take the lead—and the win—in round two. Pavidis broke on lap seven, leaving the third spot open for Brian Dunbar.

The third (and deciding) Truck Main was a repeat of the first round, with Scott Hughes jumping out to the lead and holding it till the finishing buzzer to take the overall win and the Modified Truck national championship. Pavidis and Kinwald attempted



The long triple A-mains proved to be bladder busters, as evidenced by this shot of the starting grid for the Porta-John.

to challenge Hughes, but they fell in line behind Billy Easton in the final Main. By the time Pavidis and Kinwald were able

Scott Brown's XX-4

Team Losi graphite suspension arms, shock towers and belt cover

Pro-Line M3 Square Fuzzie tires with standard foam inserts mounted on Losi XX wheels

Trinity VIS Team 2000mAh batteries

Team Losi low-CG, machined-graphite chassis plate

Novak Cyclone programmable speed control

Trinity D3 11x5 motor

Pro-Line M3 Square Fuzzie tires with standard foam inserts mounted on Pro-Line wheels

MIP Aluminum CVDs

JR 4735 steering servo

Trinity low-CG motor plate with motor heat sink

Titanium turnbuckle linkage

Front Suspension

Front ride height: just below bones level
Camber: -2°
Swaybar: no
Toe-in/out: -1° toe-out

Note: make sure that front ride height is slightly higher than rear. Front Ackerman link to inside holes on bellcranks (Scott says it always works!).

Shocks: standard
—oil: 32.5WT
—piston: No. 57
—spring: Green
—limiters: none

Rear Suspension

Pivot support: CR 2°
Ride height: just below bones level
Swaybar: no
Camber: -2°
Hole in hub: C
Hole in bulkhead: 10

Shocks: standard
—oil: 35WT
—piston: No. 55
—spring: Yellow
—limiters (inside/outside):
2 Hydra Drive washers/B

Drive Train and Chassis

One-way clicker adjustment: loose
Motor: Trinity D3 11x5
Battery placement: forward
Pinion/spur gears: 20/84

Tires (F/R)

Pro-Line Square Fuzzies, M3

ROAR MOD NATS

MODIFIED TRUCK	Fin.	Qual.	Driver	Manufacturer	Radio	ESC	Receiver	Motor	Charger	Batteries
	1	1	Scott Hughes	Associated	KO Propo Mars	LRP IPC V6	LRP Phaser	Reedy Sonic 2 10x2	KO BX 212	Reedy Zapper
	2	3	Brian Kinwald	Losi	Airtronics 3PS	Novak Cyclone	Airtronics	Trinity D3 11x2	Novak Digi-Peak	Trinity VIS Team
	3	5	Mark Francis	Losi	Airtronics 3PS	Novak Cyclone	KO	Trinity D3 12x2	Novak Digi-Peak	Trinity EX-Tech
	4	2	Mark Pavidis	Associated	Airtronics M8	LRP IPC V6	LRP Phaser	Reedy Sonic 10x2	Team Orion	Reedy Zapper
	5	9	Billy Easton	Associated	Airtronics M8	LRP IPC V6	Futaba	Reedy Sonic 2 10x2	Tekin BC112A	Reedy Zapper
	6	6	Brian Dunbar	Losi	Airtronics 3PS	GM V12	Airtronics	GM 12x3	Novak Digi-Peak	GM VIS
	7	4	Rick Hohwart	Losi	Futaba 3PJ	Novak Cyclone	Futaba	Peak EBX Pro 12x4	Novak Digi-Peak	Peak PowerFlo
	8	10	Alex Guerrero	Losi	Airtronics 3PS	Novak Cyclone	Airtronics	Peak EBX Pro 11x2	Novak Digi-Peak	Peak PowerFlo
	9	7	Scott Brown	Losi	JR R-1	Novak Cyclone	JR	Trinity D3 11x5	Novak Digi-Peak	Trinity EX-Tech
	10	8	Matt Ledger	Associated	JR R-1	LRP IPC V6	JR	Reedy Sonic 2 10x4	Yokomo	Reedy Zappers
4WD MODIFIEDS	1	1	Scott Brown	Losi	JR R-1	Novak Cyclone	JR	Trinity D3 11x5	Novak Digi-Peak	Trinity EX-Tech
	2	7	Todd Hodge	Losi	Airtronics 3PS	GM V12	Futaba	GM 11x2	GM Commander	GM VIS
	3	4	Matt Francis	Losi	Airtronics M8	LRP IPC V6	LRP Phaser	Trinity D3 12x2	LRP 110V	Trinity EX-Tech
	4	6	Richie Parkhurst	Losi	Airtronics 3PS	GM V12	JR	GM 11x2	GM Commander	GM VIS
	5	2	Brian Kinwald	Losi	Airtronics 3PS	Novak Cyclone	Airtronics	Trinity D3 11x3	Novak Digi-Peak	Trinity VIS Team
	6	3	Mark Pavidis	Yokomo	Airtronics M8	LRP IPC V6	LRP Phaser	Reedy Sonic 2 10x2	Team Orion	Reedy Zapper
	7	10	Greg Hodapp	Yokomo	Airtronics M8	LRP IPC V6	Airtronics	Maxtec Shockwave 12	Robotronic	Maxtec V-Max Platinum
	8	9	Alex Guerrero	Losi	Airtronics 3PS	Novak Cyclone	Airtronics	Peak EBX Pro 11x3	Novak Digi-Peak	Peak PowerFlo
	9	8	Rick Hohwart	Losi	Futaba 3PJ	Novak Cyclone	Futaba	Peak EBX Pro 11x2	Novak Digi-Peak	Peak PowerFlo
	10	5	Barry Baker	Yokomo	Airtronics M8	LRP IPC V6	LRP Phaser	Maxtec Shockwave 10	Robotronic	Maxtec V-Max Platinum
2WD MODIFIEDS	1	1	Mark Pavidis	Associated	Airtronics M8	LRP IPC V6	LRP Phaser	Reedy Sonic 2 12x2	Team Orion	Reedy Zapper
	2	3	Brian Kinwald	Losi	Airtronics 3PS	Novak Cyclone	Airtronics	Trinity D3 13x6	Novak Digi-Peak	Trinity VIS Team
	3	4	Matt Francis	Losi	Airtronics M8	LRP IPC V6	LRP Phaser	Trinity D3 13x2	LRP 110V	Trinity EX-Tech
	4	2	Scott Hughes	Associated	KO Propo Mars	LRP IPC V6	KO Propo	Reedy Sonic 2 13x2	LRP 110V	Reedy Zapper
	5	5	Mark Francis	Losi	Airtronics 3PS	Novak Atom	Airtronics	Trinity D3 13x2	Novak Digi-Peak	Trinity EX-Tech
	6	10	Scott Brown	Losi	JR R-1	Novak Cyclone	JR	Trinity D3 12x5	Novak Digi-Peak	Trinity EX-Tech
	7	6	Dustin Brewer	Associated	Airtronics 3PS	LRP IPC V6	Futaba	Reedy Sonic 2 10x2	Tekin BC 67	Reedy Zapper
	8	7	Billy Easton	Associated	Airtronics M8	LRP IPC V6	Futaba	Reedy Sonic 2 10x2	Tekin BC112A	Reedy Zapper
	9	8	Brian Dunbar	Losi	Airtronics 3PS	GM V12	Airtronics	GM 12x4	Novak Digi-Peak	GM VIS
	10	9	Rick Hohwart	Losi	Futaba 3PJ	Novak Cyclone	Futaba	Peak EBX Pro 12x3	Novak Digi-Peak	Peak PowerFlo

VECTOR Spec 99



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Tires F/R

Pro-Line Edge M3/Pro-Line Square Fuzzie M3

Losi Directionals Silver/Pro-Line Holeshot M3

Losi Ribbed Silver/Losi T2000 Red

Pro-Line Edge M3/Pro-Line Holeshot M3

Pro-Line Edge M3/Pro-Line Holeshot M3

Losi Directionals Silver/Losi T2000 Red

Losi Directionals Silver/Losi T2000 Red

Losi Directionals Silver/Losi T2000 Red

Losi Directionals Silver/Losi T2000 Red

Pro-Line Edge M3/Pro-Line Holeshot M3

Pro-Line Square Fuzzie M3

Losi Taper Pin Red

Losi Taper Pin Red

Losi Taper Pin Red

Pro-Line Square Fuzzie M3

Pro-Line Square Fuzzie M3

Pro-Line Square Fuzzie M3

Pro-Line Square Fuzzie M3

Losi Taper Pin Red

Pro-Line Square Fuzzie M3

Pro-Line Ribbed M3/Pro-Line Square Fuzzie M3

Losi Wide Body Ribbed Silver/Pro-Line Square Fuzzie M3

Losi Wide Body Silver/Losi Taper Pin Red

Pro-Line Ribbed M3/Pro-Line Square Fuzzie M3

Losi Wide Body Silver/Losi Taper Pin Red

Losi Wide Body Silver/Pro-Line Square Fuzzie M3

Pro-Line Ribbed M3/Pro-Line Square Fuzzie M3

Pro-Line Rib M3/Pro-Line Square

Losi Ribbed Red/Pro-Line Square Fuzzie M3

Losi Wide Body Red/Losi Taper Pin Red

to get to Easton—who eventually broke—they were too busy racing each other and were snagged by the buzzer as Hughes coasted through his last lap with the only 14-lap effort. Kinwald took second overall, and Pavidis took third.

The 4WD class ran last, but much as in 2WD, the national champion had already been decided by the second round. Top qualifier Scott Brown scorched the track with two of the four 15-lap runs during the first two rounds to lock up the 4WD national championship. Brian Kinwald was within striking distance early on with a second-place finish in the first round, but a bit of controversy in the second round dampened his chance to bid for the overall win.

After a tangle at the start of the second 4WD Main, Kinwald was in fourth and pressing hard to get to the front of the pack. He spent two laps following Barry Baker's Yokomo and waiting for a chance to get a clean pass. On lap four, Kinwald finally managed to get around Baker for the third spot then set his sights on Greg Hodapp, running in second. In the following lap, a very hard collision between Baker and Kinwald at

the end of the back straight prompted a chorus of boos from the onlookers. Both cars came out of it running, but it had tied up Kinwald long enough to knock him back to the eighth position. At the end of the Main, ROAR officials decided to impose a one-lap penalty on Baker for rough driving; he protested, insisting that he was simply trying to pass Kinwald. The officials considered Baker's protest, but ultimately decided that their decision was valid and the penalty would stand. Kinwald recovered slightly but was not able to do better than seventh position. Scott Brown, in the meantime, turned in another 15-lap run and clinched the top spot.

The third and final 4WD A-main saw Kinwald jump out to an early lead with Pavidis and Matt Francis in tow. Kinwald tubed it at very high speed while leading on lap eight, and one of his front suspension arms snapped. Pavidis took over the lead and held it until the checkered flag, followed by Todd Hodge and Richie Parkhurst. Hodge's second-place finish secured second overall, and Matt Francis, with a fourth-place finish in the third A-main, locked up third overall. ■

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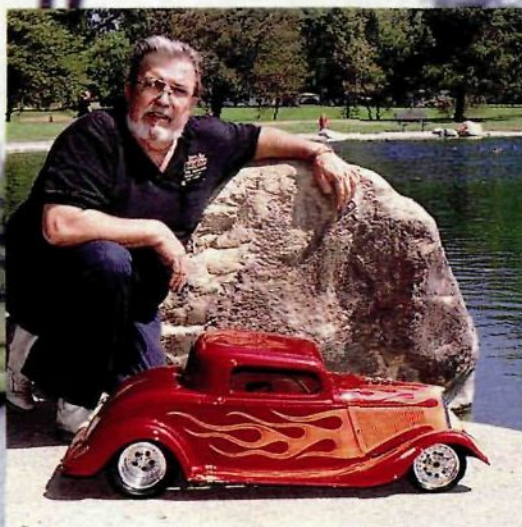
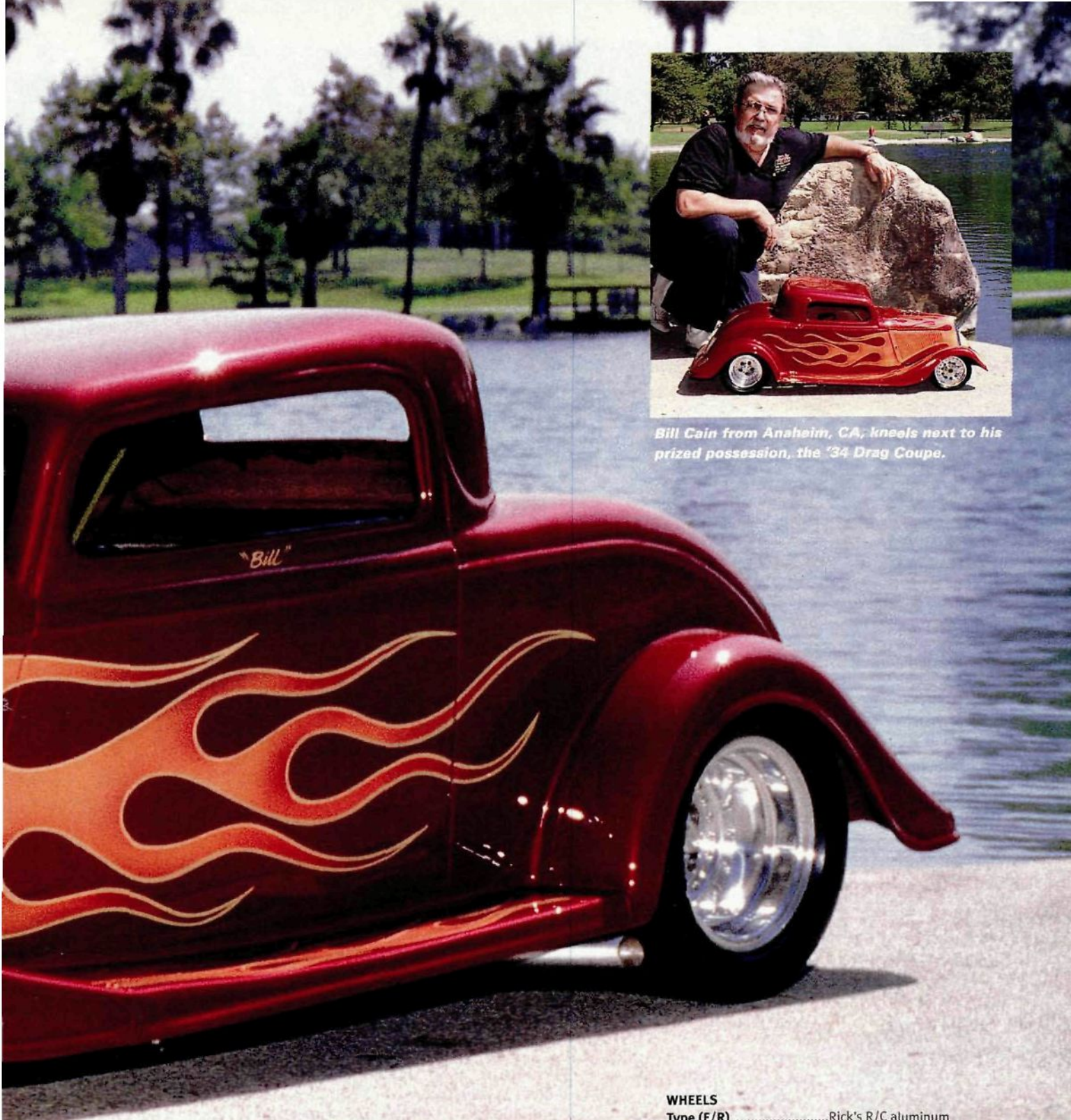
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THE HOME-BUILT 1934 Ford A-class gas drag coupe and Connolly V-8-powered drag-racing hydro speedboat shown on these pages were designed and built by Bill Cain of Anaheim, CA, and they're his prize possessions. Bill loves big toys and has been building large-scale model cars and boats for most of his life. He is also an accomplished R/C boat racer and is the owner of Toys For Big Boys—a hobby shop in Anaheim that specializes in large-scale and exotic R/C vehicles. We'll focus on the '34 Ford Coupe because it's raced and displayed at 1/4-scale drag-racing events throughout the country. (Bill hasn't had the nerve to launch the boat yet.)

1/4-scale
'34 Ford Drag Coupe

Classic "A"
gasser for
the strip or
the street

by George M. Gonzalez



Bill Cain from Anaheim, CA, kneels next to his prized possession, the '34 Drag Coupe.

SCALE1/4
COST TO BUILD\$3,500 (\$12,500
w/boat and trailer)

DIMENSIONS
Length overall40 in. (1,016mm)
Wheelbase28 in. (711mm)
Front width14.5 in. (362mm)
Rear width16 in. (406mm)

WEIGHT
Gross (RTR)19 lb. (8,618gm)

CHASSIS
TypeTube frame
Material4130 chrome alloy tube

DRIVE TRAIN
TypeSplined and sleeved pivoting drive
shaft and quick-change rear end
PrimaryRing gear and pinion gear
TransmissionPositive-traction straight axle
ClutchAdjustable centrifugal
Differential(s)None
Bearings/bushingsLarge-scale sealed ball bearings

SUSPENSION
Type—frontCrossbeam/trailing arm
—rearTrailing-arm straight axle
Damping (F/R)Oil-filled, coil-over shocks

WHEELS
Type (F/R)Rick's R/C aluminum
1/4-scale slotted drag-racing

TIRES
Type (F/R)Bicycle-type drag-racing tires/BRP
Good Year Eagle Slicks

POWER
EngineZenoah 22.5cc 2-stroke
CarbWalbro big-bore
PipeModified Bennett airplane muffler
Horsepower2hp @ 12,500rpm
FuelRegular unleaded gasoline
and 2-stroke oil (5:1 ratio)

RADIO GEAR
TransmitterFutaba 3PJ PCM
Steering/throttle servos1/4-scale Futaba S3303

• **Classic hot-rod chassis.** The '34 Ford Coupe chassis is made from 4130 chrome alloy tube and is a scale representation of a traditional hot-rod chassis. Bill bent and welded the tube in his shop, taking care to brace all the most crucial stress points. Bill's main objective, however, was to design a chassis that would conform to the body's 1/4-scale wheelbase and width specifications.

The engine is mounted in-line and far aft on rubber-bushing-supported mounts. To simplify the throttle- and brake-linkage routing, the throttle/brake servo is mounted on a custom-made aluminum bracket that's just in front and to the right of the engine. The radio equipment and 8-ounce Sullivan* fuel tank are on an ABS plastic tray that's secured to the chassis with zip-ties, and an ABS firewall houses the radio system's on/off switch.

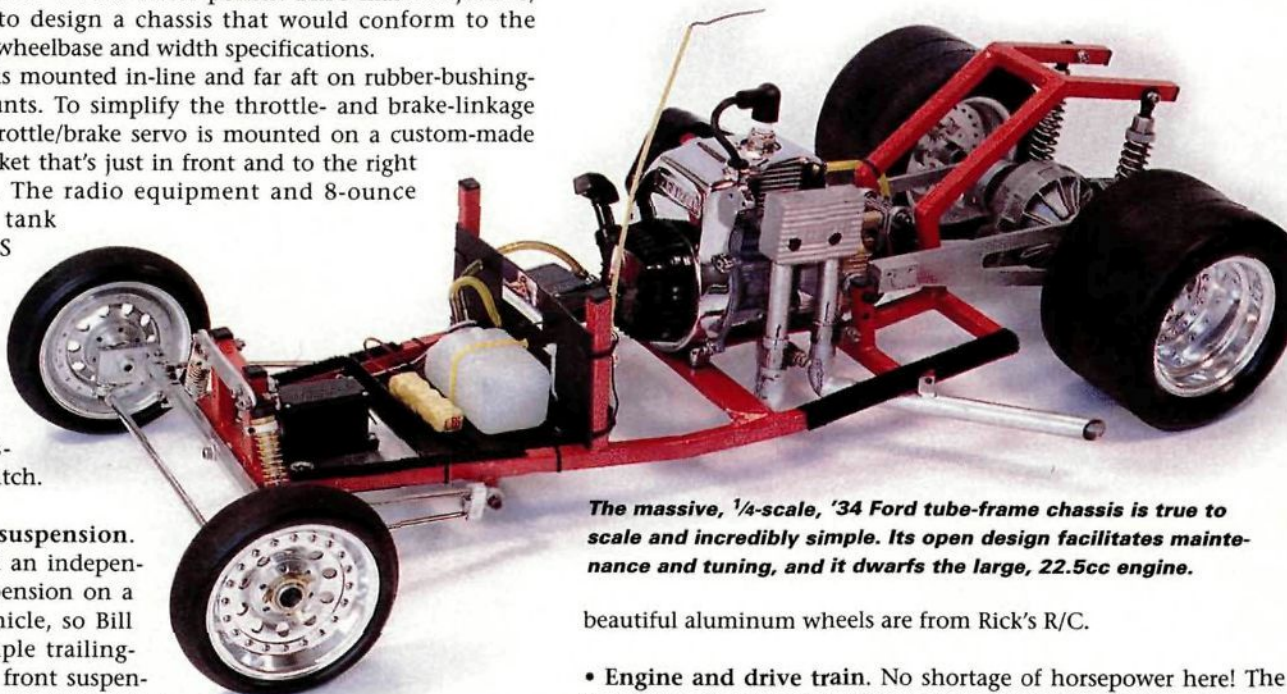
• **Super scale suspension.** You don't need an independent front suspension on a drag-racing vehicle, so Bill designed a simple trailing-arm/crossbeam front suspension and a pushrod/drag-link steering system. Team Associated* gold-anodized shocks from a retired RC10 provide the damping, while a heavy-duty 1/4-scale Futaba* S3303 servo mounted vertically on a custom aluminum servo plate cranks the wheels from lock to lock with authority.

Bill scratch-built the front hub carriers, axles and aluminum front crossbeam and bought the miniature heim joints used at all the pivot points from a company that manufactures miniature bearings. Rick's R/C made the front wheels, and the knock-offs are by Skellenger Engineering*.

In the rear, there's a trailing-arm straight-axle suspension that—you guessed it!—Bill handcrafted to work with the Skellenger Engineering quick-change rear end. The trailing arms pivot on bearing-supported miniature heim joints, and the custom-machined axle "birdcages" are also bearing-supported. The straight axle is 1/2-inch-diameter steel tube, and the cool-looking wheel hubs and oil-filled, coil-over shocks came from a 1/4-scale model manufacturer (Bill couldn't recall which one). Thanks to the large footprints of the Goodyear Eagle slick tires from Bishop's Racing Products*, traction is no problem. Once again, the



The coupe has more than enough torque to pull a boat on a trailer. As you can see, the coupe and boat have matching paint jobs.



The massive, 1/4-scale, '34 Ford tube-frame chassis is true to scale and incredibly simple. Its open design facilitates maintenance and tuning, and it dwarfs the large, 22.5cc engine.

beautiful aluminum wheels are from Rick's R/C.

• **Engine and drive train.** No shortage of horsepower here! The Zenoah* weed-whacker 22.5cc engine features a balanced crankshaft and big-bore Walbro carb and was ported and timed by J.G. Racing Products* to squeeze out every ounce of torque. For instantaneous power delivery, J.G. also lightened and adjusted the centrifugal clutch for drag racing. You couldn't have a hot rod without an ample dose of chrome under the hood, and as you can see by the photos, Bill chromed everything he could pull off the engine!

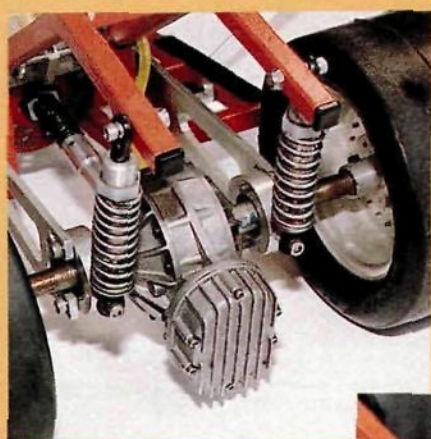
A Bennett* airplane muffler makes a simple, scale-looking exhaust system. The two pipes are made of steel tube and were bent and shaped to exit just in front of the rear tires on both sides of the car; they're attached to the muffler tips with standard Bendix fasteners.

Because of the engine's in-line mounting, a very simple drive train with a satisfying scale appearance was possible. A custom-machined drive yoke mates with a splined and sleeved pivoting Skellenger Engineering drive shaft, which in turn mates with the quick-change rear end via ring and pinion gears. A conventional, servo-actuated disk-brake system with a huge fiberglass disk brake is mounted directly behind the clutch housing and is more than capable of locking up the rear wheels. Another 1/4-scale Futaba S3303 high-torque servo handles the throttle and brake chores. In addition, the entire drive train and all four wheels spin on large-scale ball bearings.

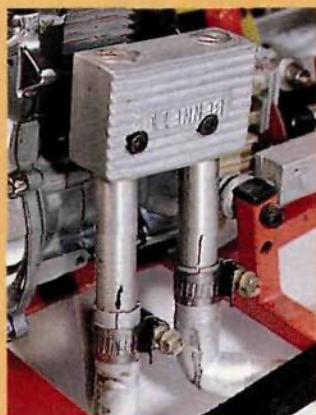
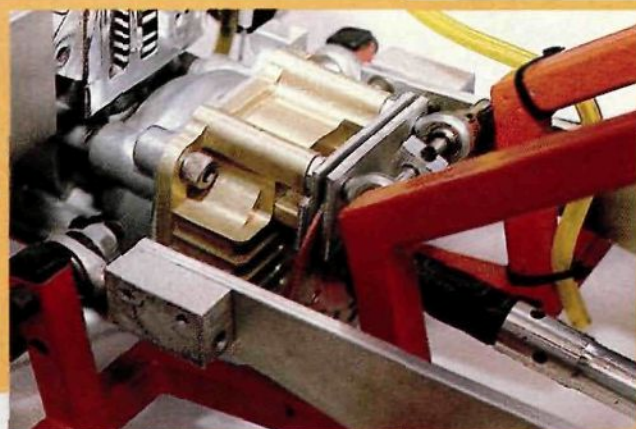
• **Classic coupe cab.** The eight-piece fiberglass 1934 Ford Coupe body was manufactured by WCM but is no longer in production (as far as we know). Bill filled all the seams around the doors, trunk, etc., with Ever Coat filler to give the body the seamless aerodynamic look of a Nostalgic Drag Racing Association A-class gas coupe.

The original four-piece fold-over hinged hood was replaced



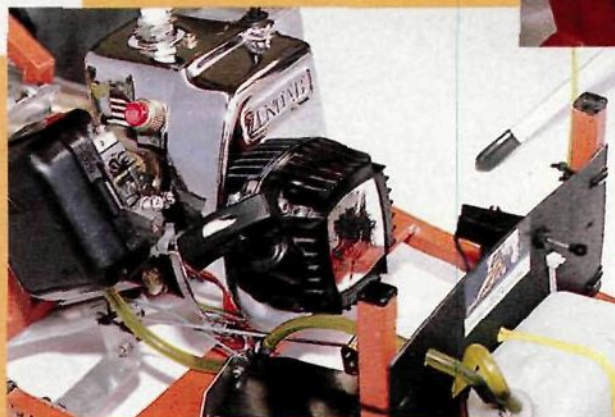


Left: is this a scale-looking rear end or what? The Skellenger quick-change rear end is every bit as functional as a full-size quick-change rear end. Check out the custom-made trailing arms and bearing-supported cages that support the straight axle—very trick! **Right:** the Skellenger centrifugal clutch housing and massive disk-brake system. Look closely, and you'll see the custom-machined drive yoke and how it mates with the Skellenger splined drive shaft.

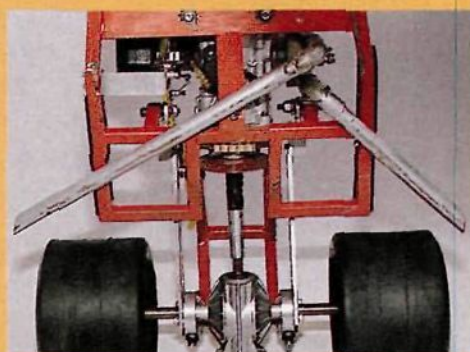


Above: a Bennett airplane muffler simplifies the exhaust-pipe routing.

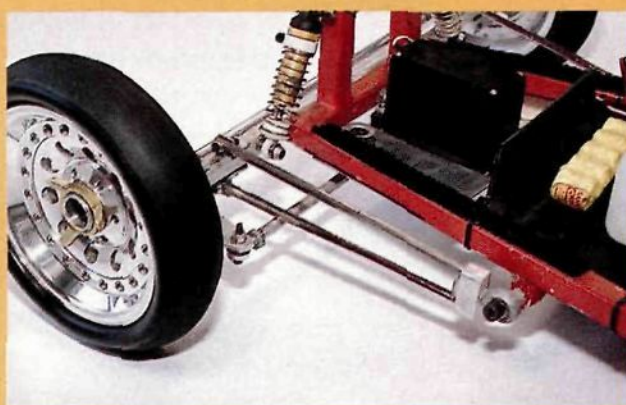
Right: the exhaust-pipe tips exit just in front of the rear tires and spew out smoke on both sides of the car. Check out the straight drive shaft that mates with the quick-change rear end. Got to love those meats!



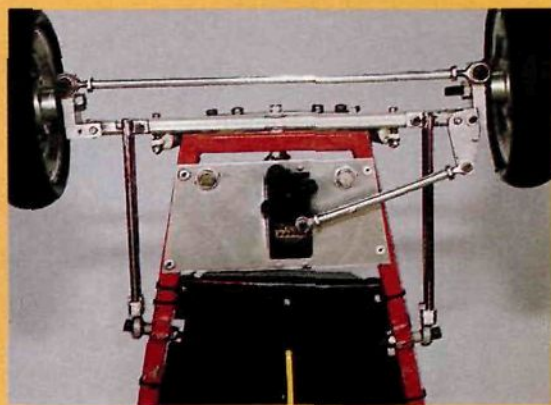
Left: a highly massaged Zenoah 22.5cc engine provides plenty of power for those occasional stoplight-to-stoplight encounters. If you look to the lower left side of the photo, you'll see the Futaba S3303 throttle/brake servo and its custom mount.



Above: the easy-to-access fuel tank and receiver battery pack. The radio system's on/off switch is mounted on the firewall, and the receiver is wrapped in a balloon and mounted on the firewall's other side. Bill says the fuel tank holds enough fuel for 15 minutes of high-speed cruising.



Left: check out the scale-like custom-made trailing arms and the miniature heim joints. The Rick's R/C slotted aluminum wheels are real showstoppers. **Right:** the front end utilizes a simple crossbeam front suspension with a pushrod/drag-link steering system. A powerful Futaba S3303 1/4-scale servo easily handles the steering.



with a more functional one-piece hood that Bill molded of fiberglass. Secured to the body with two cowl locks, the hood is easily removed to allow access to the fuel tank and radio gear. Another set of cowl locks secures the front of the body to the chassis, and hook-and-loop tape secures the rear of the body to the chassis.

The coupe's original cast-aluminum grill was replaced with a molded unit that was painted and detailed with Pactra* striping tape. The K&B* 11cc marine velocity stacks that protrude through the opening in the hood make the coupe look as if it has fuel injection. The Lexan front windshield was tinted with Pactra black window tint.

The body was painted with automotive paints by Caliber Collision Center in Norco, CA. Several coats of primer were laboriously sanded smooth, and the body was then painted with Standox Acura Pearl Red and finished with several coats of Standox Clear Coat. Wild Bill's Pin Striping in Riverside, CA, did the final flame airbrushing and pinstriping.

We hope this article will inspire you to build your own custom vehicle, and we encourage all readers who have prized home-builts to write to us and show your work. Enjoy!

**Addresses are listed alphabetically in the Index of Manufacturers on page 241.*

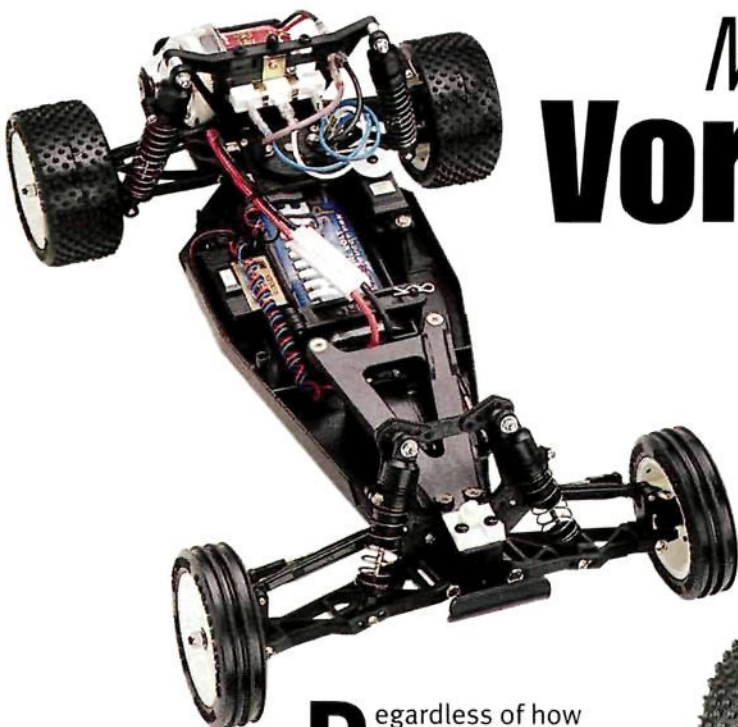
Tuning and Modifying the

MRC Vortex

by Peter Vieira

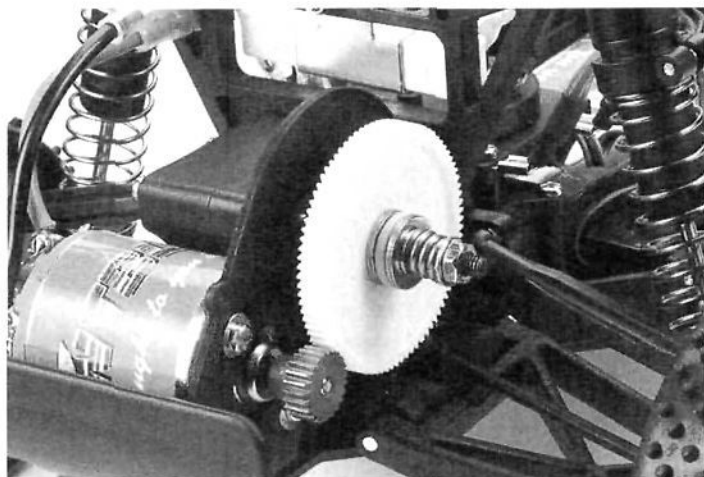
*Punching up the performance
of a backyard blaster*

Regardless of how experienced they are, R/C hobbyists always want more from their vehicles: more speed; more power; more agility. But beginners are usually the ones who scream loudest for more, more, more! as they master their vehicles. The MRC* Vortex, last spotted in our "Budget Buggy Guide" (August 1998 issue), is a good example of an entry-level car that is ready and willing to go to the next level of performance with just a few well-placed tweaks. You Vortex owners out there will definitely want to hit the bench when you've finished this article, but don't feel left out if you aren't in the MRC club; just about all of the tips outlined here are good for other budget buggies as well.

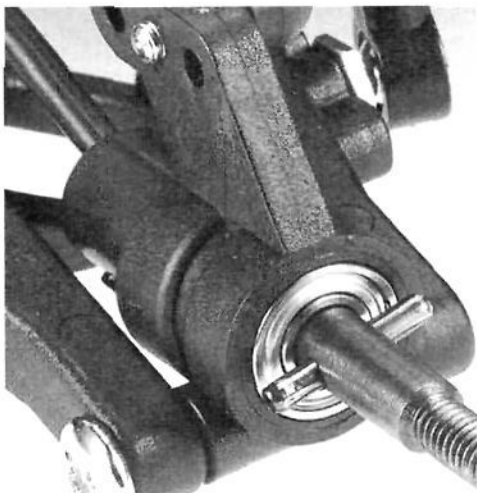


PHOTOS BY WALTER SIDAS

- **Slipper clutch.** The slipper will increase the performance and durability of your buggy. Its limited slip action (hence the name "slipper clutch") softens the power delivery to the tires and allows smoother, straighter starts as it reduces the chance of a spinout when getting back on the gas after a turn. In addition, the slipper protects the transmission gears when the buggy pounds through rough terrain or lands off jumps; these sorts of jolts can prematurely wear or strip gears in clutchless vehicles. It's a straightforward task to install MRC's clutch in the Vortex, but you will need to disassemble the transmission if your car is already built.



MRC's slipper-clutch option (part no. 9456015) is a must-have if you plan to install a hot motor and run the Vortex in the rough stuff.



Ball bearings reduce friction and wear, require little maintenance and prolong the life of the drive train. MRC offers a complete set (9426001), but you'll have to tear the car down to install 'em. If possible, install bearings when you build the car.

- **Bearings.** In addition to maximizing speed and efficiency, bearings also allow the car's rotating parts to fit and operate more precisely. The bearings simply press in wherever bushings are normally called for. If you want to get out the door as inexpensively as possible, you can live without 'em; properly lubed bushings work fine. But if possible, install bearings when you are building; this will avoid the hassle of tearing down the car later.

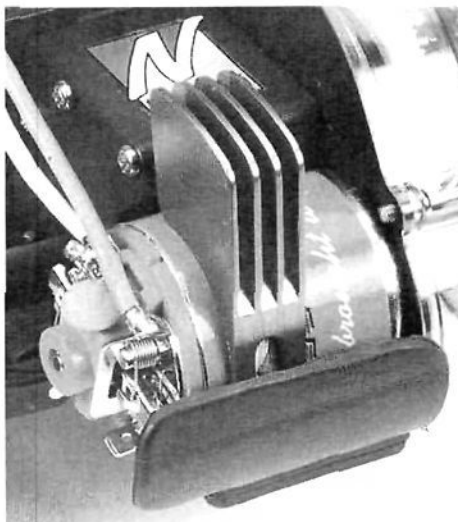
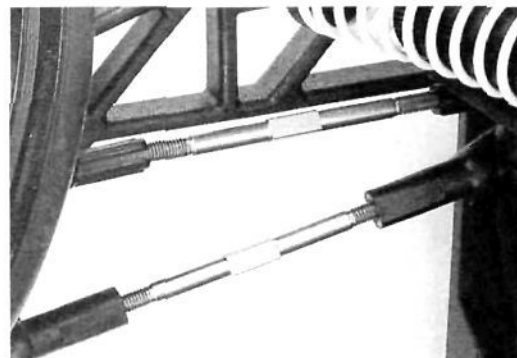
- **Electronic speed control.** Since the original review of the Vortex and the recent "Budget Buggy Guide," MRC has upgraded the Vortex's circuit-board-style mechanical speed control with an enclosed unit. The new controller is much more reliable than the previous one, but nothing tops an



A quality ESC (such as this Novak 610-HRV) offers the ultimate in smooth throttle control and no-maintenance convenience.

- **Turnbuckle camber links.** A turnbuckle itself does not improve performance; it's the *adjustability* allowed by a turnbuckle that improves the car's performance. Simple steel units are very inexpensive, but for superior strength and weight savings, I recommend a set of titanium turnbuckles. Although expensive compared to steel, titanium units are well worth the money and, at about \$20 for a set of four, aren't terribly expensive.

Turnbuckle tie rods make it simple to adjust camber and toe-in. Steel units can be purchased inexpensively, but I went all out with blue titanium pieces from Associated's Factory Team line.



electronic speed control (ESC) for precise control and reliability. If you've become used to having reverse, get a reversing ESC. For optimum efficiency and/or racing duty, get a forward-only unit. Some ESCs include bullet connectors and a standard battery plug, which makes installation a 5-minute, no-solder affair.

- **Heat sink.** When racing, competition vehicles are worked hard for four or five minutes then enjoy a lengthy rest before the next race; cars used for play

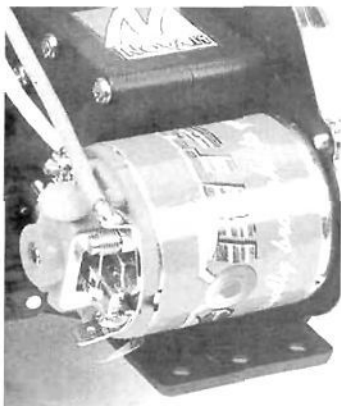
A heat sink will help keep your motor cool (or less hot, at least). A rest between packs is always a good idea.

SMART HOP-UPS

(continued from previous page)

rarely enjoy a rest until all the packs have been dumped. Back-to-back-to-back runs really heat up a motor, so a heat sink is always a good idea. It will help cool the motor, and this will preserve the motor magnets' strength.

- **Faster motor.** MRC now includes a Point Blank competition stock motor with Vortex kits, so you can skip this hop-

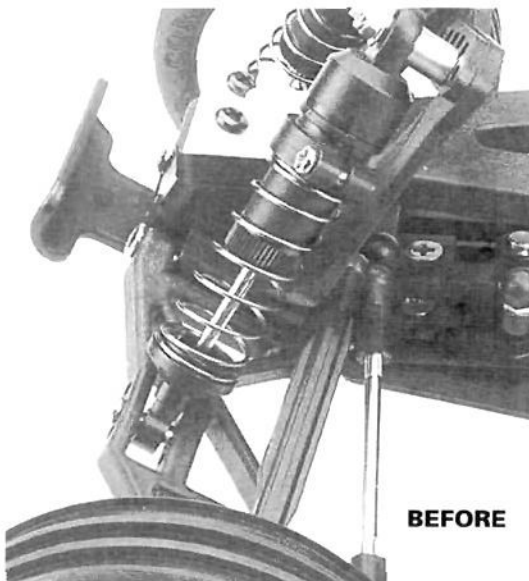


MRC now includes a race-worthy Point Blank stock motor with Vortex kits. If you're running a generic sealed-endbell motor, a competition stocker will give you more scoot.

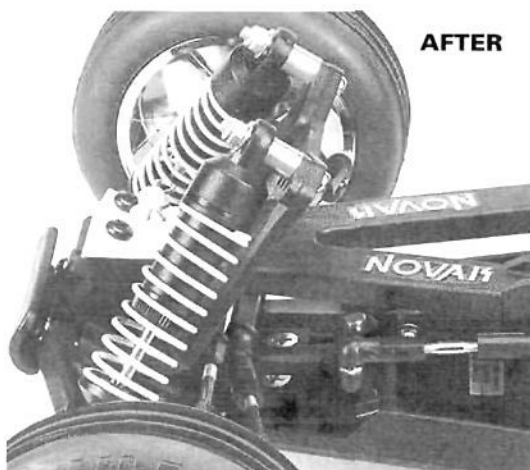
up if you're buying a new kit. If you have an older buggy, or any vehicle with a sealed-endbell stock motor, you'll definitely want to move up to a competition stocker such as the Point Blank shown here.

- **Softer tires.** The Vortex's firm rear tires are aggressively knobbed with a very flat tread; this makes them good for street and trail use, but they aren't the hot setup for racing or track play. Once you've worn out the stock tires, get something stickier with a tread pattern appropriate for your track (ask around). The Pro-Line* "Bow Ties" I installed on my Vortex work well on soft, loamy surfaces. The firm front tires were also swapped for softer Pro-Line rubber, but the edgy stock tires work pretty well. The chrome wheels are MRC optional parts (part no. 9432050—front; 9432049—rear).

Here are some miscellaneous tweaks I made to further enhance the Vortex:



BEFORE

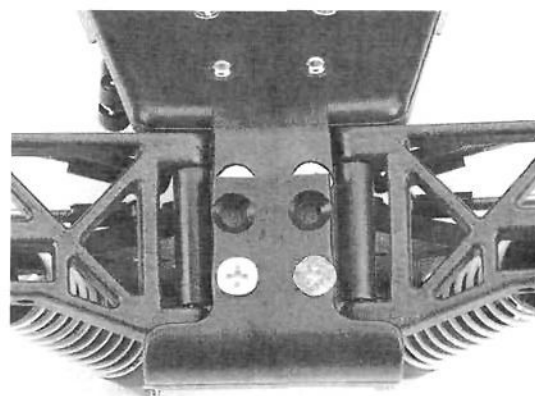
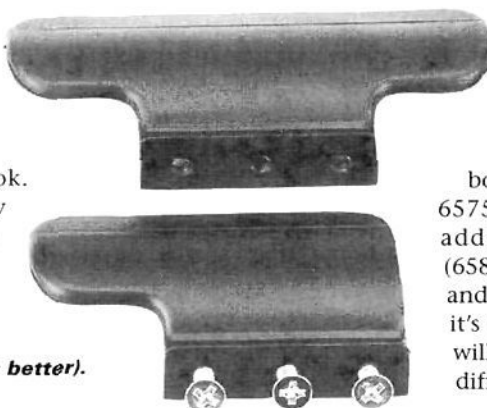


AFTER

The lengthy front bumper tends to dig in when approaching steeper jumps or making nose-down landings. It's easy to give the Vortex a "nose job."

- **Bobbed bumpers.** The stock bumper is extra long—all the better to shrug off big hits. When you run the Vortex on an off-road track, however, the bumper can "dig in" and cause the buggy to endo onto its lid. I simply drilled another set of holes to mount the bumper closer to the front bulkhead. I also trimmed the extra-wide rear bumper to save a few grams and give the chassis a cleaner look. The motor is still amply protected from any hits it might encounter.

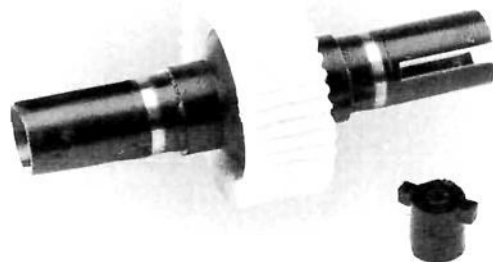
The rear bumper was trimmed to shave a few grams (and I think it looks better).



If you drill new mounting holes, you can move the bumper to a less snag-prone position while maintaining front-end protection.

- **Blue screws.** A mix of blue fasteners from Trinity* and Associated was added to trim a few grams and add eye-appeal. The stock steel fasteners were retained in high-stress areas such as the suspension mounts and transmission case.

The stock differential T-nut (shown here removed from the diff) can be replaced with an Associated diff screw and nut. For super-smooth diff action, try using Associated diff balls, thrust balls and thrust washers when you rebuild the diff.



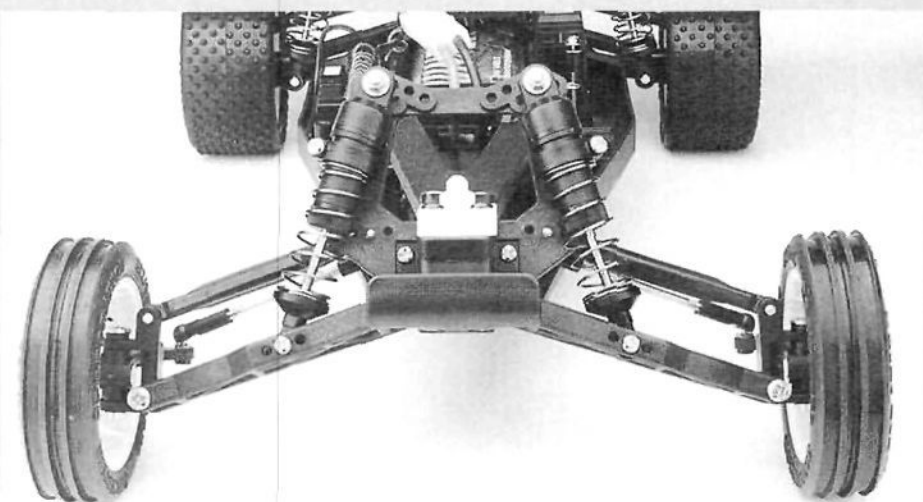
- **Diff fixer-upper.** If you run the Vortex in high-traction conditions with a hot modified motor, but don't add a slipper clutch, you may find yourself overtightening the ball diff to prevent slippage. If you overdo it, you're likely to strip the brass insert out of the plastic diff nut. If this happens, and the MRC part isn't available, don't worry; you can replace the MRC piece with a T-nut and diff bolt from Associated (part no. 6575). You might also consider adding Associated diff balls (6581) and thrust bearings (6574) and thrust washers (6573) when it's time for a rebuild. The parts will give your Vortex exceptional diff action.

• Shock position and ride height.

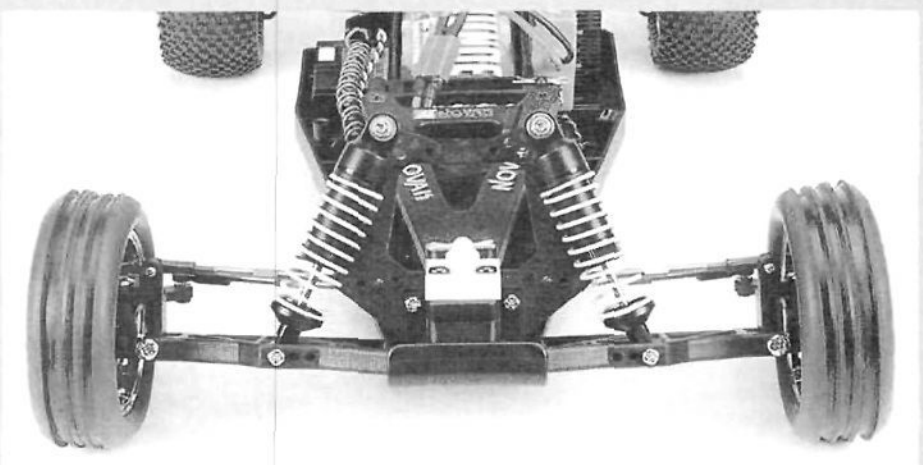
Here's where careful adjustment can really transform a buggy. Built according to MRC's instructions, the Vortex has a ton of ground clearance but very little down-travel. The extra clearance is helpful when running the Vortex over rocky terrain, but it doesn't make for a very stable-handling car. To lower the car, remove the shocks, springs and spring collars. You'll notice that the collars have a thin lip on each side to center the spring over the shock body. This lip is only needed on one side of the collar; trim off the lip on one side of each collar so they can slide all the way up the shock bodies. Finally, remount the shocks to the outside holes on the suspension arms (front and rear) and the uppermost holes on the front shock tower.

• **Damping and springs.** Simply lowering the Vortex goes a long way to improving its handling, but sorting out the ideal damping and spring rates will bring the car's performance to its highest level. MRC's stock setup calls for 2-hole pistons in the rear shocks and 4-hole pistons up front. The front end works well, but the rear end is a bit over-damped. There are two possible solutions; you could switch to 4-hole pistons and use the kit oil, or leave the 2-hole pistons in and use a lighter weight oil. Best bet: pick up some 20, 30 and 40WT oil (stick with one brand) and experiment with various piston/oil combinations.

An additional tuning component is spring rate. This cannot be adjusted; the only way to alter spring rate is to replace the springs. Losi* springs fit perfectly and are widely available. To drastically oversimplify, a softer spring will increase traction, while a stiffer spring will decrease traction; experiment. I run on a track with medium-size jumps and a fairly bumpy, soft surface; here's what works for me: Losi red rear springs and green fronts, 4-hole pistons all around, 20WT oil up front, 40WT oil in the rear. I raised the rear shock collars until the dogbones were level, and removed the front shock collars entirely to level the front arms.



The stock springs and shock positions leave the Vortex with nearly zero down-travel.



By removing the front shock collars, adding Team Losi green springs and changing the shock positions, the front end can be set with some "sag" for improved off-road handling.

There is a shallow lip on each side of the shock collar; the lip may be removed from the top side of each shock collar to allow for greater suspension sag.



HOW DOES IT RUN?

Although it doesn't look much different from a stock Vortex, the performance-prepped version drives like a whole 'nother buggy. It feels as planted as a racecar, and it's rock-steady through bumpy, rutty sections. I've got the car set up for a little bit of understeer, so it's very forgiving to drive; unless you have the skills to fully exploit a full-on racing buggy, there's no liability to

racing a Vortex. And after the race is finished, feel free to launch it off the berms; durability hasn't changed at all, so the Vortex can still take a merciless pounding. However, gnarly backyard action no longer suits the car with the racy setup; there just isn't enough ground clearance for running on grass, over rocks and roots, and so on. If that's your bag, it only takes a minute or two to jack up the ride height with the

adjustable shock collars.

Inspired? I hope so. Try out these tweaks on your own car; it's always rewarding when those subtle changes add up to real performance gains. Have fun!

*Addresses are listed alphabetically in the Index of Manufacturers on page 241.

ROADRUNNER/ELITE XPRESS PRO '98

(Continued from page 64)

try the factory setup. I was asked whether I wanted a stock motor, but I turned it down because of my need for speed. I should have listened because the Maxtec* V-Max batteries and ShockWave motor are way fast. Did I ever get humbled quickly! I will tell you this though: the car was ballistic, as the Cyclone proved to be a smooth, powerful and versatile speed control.

The Yokomo* Sprint tires provided plenty of traction and I had more than enough steering. The car seemed to anticipate my every move two seconds before I even thought of it, but it was too aggressive for me.

I headed back to the pits looking for a more forgiving feel. Being stubborn, I kept the modified motor in place, confident that I could handle it. Team Xpress drivers Tom Prendergast and Robbie Collins came to my rescue and offered me a more suitable alternative setup.

After a little wrenching, I was off again. Immediately pulling full throttle, I noticed that the car was much more controllable. It turned hard into the corners with absolutely no signs of push, and the back end followed perfectly. I was able to throw the car into a controlled four-wheel

drift that was pure fun, and even kept up with a fellow racer who usually wins the A-main 4WD modifieds. Not bad!

The car that only moments earlier had seemed twitchy and over-responsive was now smooth and controllable. This is an indication that the Xpress Pro is ultra-versatile and can change its characteristics with only minor wrenching.

I'm used to things wearing out rather quickly in the off-road world, so after quite a few battery packs, I carefully inspected almost every component on the car. I was very surprised that there was no noticeable wear. The plastic outdrives weren't even fazed by those nasty modifieds. Incredible!

FINAL THOUGHTS

The Xpress Pro is a precision vehicle that offers endless tuning adjustments that you can really take advantage of. And after your wrenching, the Xpress rewards you with an E-ticket ride that you will enjoy time and time again.

I've been told that going sideways into every turn is not fast, but darn it, I'm just having too much fun countersteering, and isn't that what it's all about? Thumbs up to the Pro '98, and I'll see you at the track. Forever sideways!

*Addresses are listed alphabetically in the Index of Manufacturers on page 241.

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Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.



200
Integy
INDI Reactor 20



202
RPM
Ride Height Gauge



202
OFNA
Starter Box



204
BRP
Touring Car
Wheel Adapters



206
Robinson Racing
HPI RS4 Pro
Spur Gear
Adapter

INTEGY INDI Reactor 20 Bye-bye bulbs!

In a hobby full of high-tech goodies, one decidedly low-tech, handmade, rough-around-the-edges device is still a staple among racers and hard-core enthusiasts: discharge bulbs. I still have my set of 10, 1157 automotive brake lamps, soldered together according to instructions in *Radio Control Car Action*, and they work great. However, I'm always afraid of breaking them, they get really hot, and they take up a fair amount of bench space. There has to be a better way; I think Integy's* INDI Reactor 20 is it.

Like my bulbs, the INDI Reactor 20 draws 20 amps—a suitably high (but pack-friendly) amp-draw rate for dumping and cycling packs. The Reactor accomplishes this via a heavy-duty resistor bank within the unit. As you might imagine, those resistors get mighty hot when dumping a fully charged pack; to help prevent the Reactor from going, uh, nuclear, a small cooling fan is built into its rear side. Cool air is pumped past the resistors and out through the louvers in its face, where it emerges as warm air. I'm looking forward to using the Reactor as a hand warmer during those late fall races!

In the bonus department, voltage-cutoff circuitry is built into the unit to prevent it from over-discharging. Once the pack voltage has dropped to 5.4 volts, the Reactor automatically shuts down. A bank of 10 LEDs wink out one by one as the pack is depleted, allowing

you to visualize the discharge characteristics of the pack. Matched packs give their all then shut down as if someone flipped a switch; unmatched sport packs flatten out after they've lost their punch and then creep along until they finally conk out.

A pair of short leads furnished with alligator clips allows the INDI Reactor 20 to dump packs with or without connectors (the insulated clips are small enough to clip to female Deans connectors and sneak

inside Tamiya-type plugs). However, the leads are definitely on the short side and require the pack to be very close to the discharger; I plan to splice in a few more inches of wire for the sake of convenience. Once a fully charged pack is hooked up and cooking, the Reactor will reach the uncomfortable side of hot. When dumping residual voltage after a qualifier, it only gets

warm. Another caution: watch your fingers if you move the unit while it's operating; the exposed fan can buzz your tender digits. It won't hurt you, but your buddies will make fun of you when you scream like a girl (not that it happened to me).

The INDI Reactor 20 is a simple product that simply works. It will do what a set of 10 bulbs and a cutoff box will do, but does it in less space and with a much more durable design. It's a good product for racers and anyone else who wants to take good care of his packs.

—Peter Vieira

LIKES

- Built-in cutoff device.
- Internal cooling fan.
- No bulbs to break.
- Compact.

DISLIKES

- Leads are short.
- Fan can buzz careless fingers.
- Can become uncomfortably hot.



SPECIFICATIONS

Discharge rate: 20 amps

Cutoff voltage: 5.4 volts

Input: 7.2 to 8.4 volts*

Features: internal cooling fan; voltage-cutoff circuitry; LED power indicator.

Price: \$45.99

*unit is powered by discharging battery; no additional power is required.

RPM

Ride Height Gauge

A tool that measures up to the task

Racers who regularly compete in on-road racing events know that chassis setup is extremely critical, and the slightest tweak can make a noticeable difference on the track. Accurate camber, toe-in/out and ride-height adjustments aren't that necessary if you're just out racing on open parking lots and street corners, but if you're racing nine other cars on a narrow roadcourse, these adjustments will be extremely important. RPM's* Camber and Toe-in Gauges have helped racers easily and accurately align their cars for maximum performance, and now a handy Ride Height Gauge has been added to complete your tuning arsenal.

The new RPM Ride Height Gauge is available in standard and metric models (part no. 8130—standard, 8115—metric; \$8.95 each) and is just as easy to use as the company's camber gauge. The tool accurately measures your vehicle's ride height and has a measuring distance of 0.150 inch to 1.150 inches (the metric unit measures from 4mm to 29.5mm). This makes the tool suitable for some 2WD off-road applications as well, but it cannot measure the ride height of vehicles with ride heights taller than 1.150 inches.

The tool's ingenious design uses a base and a slide that travels along at a 20-degree angle. It has a graduated scale along the upper

The Ride Height Gauge in action. The tool is perfect for any on-road car and will work on some off-road vehicles, too.

The RPM Ride Height Gauge is accurate and affordable, and it nicely complements the company's Camber and Toe-in Gauges. Standard and metric models are available.

edge of the base with easy-to-read lines and numbers. Each gradation represents 0.025 inch on the standard gauge and 0.5mm on the metric model. Each gauge has two measuring platforms. The lower platform will measure from 0.150 inch to 0.650 inch on the standard gauge, and from 4mm to 16.5mm on the metric model. The upper measuring platform is for use on vehicles with a taller ride height; to get a numerical value, you'll need to add 0.500 inch to the scale reading on the standard model and 13mm on the metric model. A spring-loaded tension knob locks the gauge after you've measured the chassis so you can remove the tool and measure the other side.

LIKES

- Compact size.
- Affordable.
- Matches the company's Camber and Toe-in Gauges.

DISLIKES

- Not compatible with all cars (not for use with high-riding, off-road vehicles).

Ride height plays an important role in chassis tuning, and the RPM Ride Height Gauge can help you make accurate adjustments. I've also found the Ride Height Gauge quite useful for making tweak adjustments on touring cars, by measuring the vehicle's left and right heights on the front and rear portions of the chassis; the heavier side will always be lower. From that point, you can add weight to the lighter side or add thin preload spacers to the shocks on the heavier side. The tool is very compact, so it's easy to store in your toolbox and has a very rugged design. And it matches the company's Camber and Toe-in Gauges, which makes for a complete-looking tuning ensemble.

—George Gonzalez

OFNA

Starter Box

Full-option starter

A starter box just turns the engine over, right? Yes; but wouldn't it be convenient if the box incorporated just about everything you needed to get any gas car movin'? OFNA's* new Super Starter (part no. 10253—with glow panel, \$129.95; 10250—without glow panel, \$99.95) is just such a box; it's far more than just a starting motor in a steel case, it's a starter box that can start just about any type of car, and it includes a power panel to charge your remote glow starter or plug-in glow clip. Here's the rundown.

The durable steel case is painted in a bright-blue finish and is held together with several screws and pop-rivets for sturdy construction. The top plate features many slots into which to place the guide wedges to hold and align your car with the starting wheel. You will also notice the "L"-shaped slot for the starter wheel to poke through. The motor can be repositioned to accommodate the various engine-mounting positions of $\frac{1}{10}$ - and

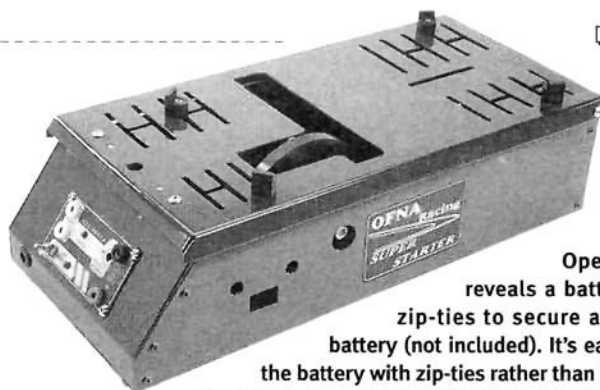
$\frac{1}{8}$ -scale cars. The rubber starting wheel is molded onto a bell-shaped starter wheel that positions the wheel over the motor's core. This is what enables you to change the motor's position and still have it fit in the box.

LIKES

- Adjustable motor for $\frac{1}{8}$ - and $\frac{1}{10}$ -scale cars.
- Power panel.
- Sturdy construction.

DISLIKES

- Plug-in glow clip not included.
- Wiring diagram not included.



Opening the box reveals a battery tray with zip-ties to secure a 12V gel-cell battery (not included). It's easier to mount the battery with zip-ties rather than fuss with double-sided tape, which tends to lose adhesion.

A handle on the side of the box makes it easy to cart the unit around, and there's a power switch on the same side to disable the power to the motor when not in use. There are also two charging jacks above the switch, but they aren't hooked up.

How many boxes include a power panel? Not many. The power panel allows you to use a plug-in glow-igniter clip (not included), and a trim pot adjusts the current to heat the plug. The glow plug look-alike that is bolted to the panel can charge a remote glow starter. Handy LED indicators let you know the functions are working properly.

To see how well the starter works, I brought it along to start the cars in the $\frac{1}{8}$ -scale buggy guide that's also featured in this issue. The box fired up the cars pretty well, although the motor had a little trouble with the fresh, high-compression engines. The motor should have no problems, however, with an engine that is properly broken in. The power panel came in handy when I needed to recharge my glow starter by the track. The starter proved itself durable as well as convenient, as it started our buggies countless times. The OFNA Super Starter gets a thumbs up in my book. —Greg Vogel

BRP

Touring Car Wheel Adapters Bud's Hubs

We all want cool wheels for our R/C cars, but installing a set of trick rollers is easier on some types of vehicles than on others. Touring-car enthusiasts have it easy; among RPM, Pro-Line, GTP, GM and other companies, there are hundreds of hot hoops ready to be plucked from the hobby shop wall for instant installation. Pan-car guys have it the worst, especially if the car in question is just for parking-lot play; pavement eats up foam tires quickly, and staid BBS or NASCAR rims in black or white are the usual style options.

Bud's Racing Products (BRP) to the rescue; their new Touring Car Wheel Adapter Hubs (part no. 6745) will allow you to ... well, I think you can guess what they do! The kit includes everything you'll need to mount a complete set of 12mm, hex-hub touring-car wheels to any pan car. That sounds simple, but the job is tougher than you might think; BRP had to figure out how to get bearings into the front rims, and it had to bridge the gap between the vastly different offsets of pan-car rear rims and touring rims. I'm pleased to say that the challenge was met with great success, and the resulting product is simple to install.

The rear wheels are easier to mount. The machined-aluminum adapter hub is simply bolted to the existing pan-car hubs and secured with the included 4-40 Allen screws. The holes in the adapter hub are slightly oversize to accept the larger 5-40 screws used with Bolink cars, but there's no need to worry about slop when using the 4-40 fasteners; the precisely machined aluminum hub centers perfectly on the flange of the pan-car hub. Once the adapter hubs are in place, the touring-car rims simply slide over the hex and are secured with the included 8-32 button-head screws. A few words of caution, though; the diff cannot be adjusted without removing the adapters, so make sure that it's tight before you begin.

Note the aluminum sleeve that is pressed into the wheel's hex. The inboard bearing is held by the sleeve, and the outboard bearing is pressed into the bored-out wheel.

The front rims require a little more attention. Since touring-car rims don't have nearly enough material to accept the bearings required for pan-car use, an aluminum sleeve must be epoxied into place to hold the bearings and provide the correct offset. As I read the instructions, I thought, "Epoxy? That'll never work." As I assembled the front wheels, however, it became clear that someone at BRP had his thinking cap on.

The bearing sleeve is a tight fit in the rim's hex and does not wobble at all—even without epoxy. After the sleeve has been glued in place, it serves as an effective jig for the next step, in which a 5/16 drill

bit is spun through the sleeve to bore out an appropriately sized hole in the front of the touring-car rim. Once drilled through, the pan-car wheel bearings are pressed in, and the wheels are mounted. The completed front rims roll true and feel like factory equipment. And they look great! The only bad news is the price; \$39.95 is a bit steep if you're just looking to add a little "cool" to an inexpensive pan car, Bolink Legends or Digger. However, you do get what you pay for; all the included hardware is super-high quality, and the machine work on the rear hubs makes \$39.95 seem like an outright bargain.

— Peter Vieira

LIKES

- Beautifully machined parts and top-shelf hardware.
- Easy to install.
- Opens the door to unlimited wheel options!

DISLIKES

- A bit pricey.
- Once installed, no diff access.
- Once converted for pan-car use, front rims cannot return to touring-car duty.

Looks pretty salty, don't ya think? With all the sticky sedan tire options out there, you can get your pan car to hook up pretty well.

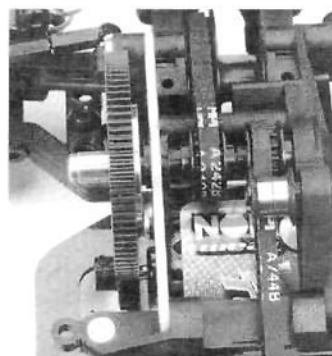
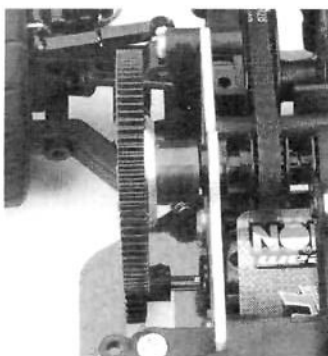
ROBINSON RACING

HPI RS4 Pro Spur Gear Adapter

Get Close

It's a fact: there isn't an R/C car out there that can't be improved. There are always some little tweaks that can make a car more convenient to work on, less likely to break, or just plain perform better. Robinson Racing has a knack for spotting those areas that could use improvement and has turned its attention to the popular HPI RS4 Pro.

So what's the problem that needs fixing? No problem at all really, as long as you use HPI's pinions in your RS4 Pro. The longish shank of the



Before (left) and after (right): note that the pinion is now reversed, and both gears are very close to the motor plate.

HPI pinions reach the car's well-offset spur gear and still keep plenty of meat on the motor's output shaft. Conventionally sized pinions, such as Robinson's own popular gears, are shorter and barely reach the spur. To maintain a reasonable amount of gear mesh, the pinion must ride on the very tip of the motor shaft, and that can lead to spun pinions and an amplification of any wobble the motor shaft may have.

LIKES

- Reduces rotating mass.
- Moves spur closer to motor plate for full mesh with "regular" pinions.

DISLIKES

- I don't do this very often, but I gotta say "none."

To fix the problem, Robinson's ingenious gear adapter for the HPI RS4 Pro (RRP1150) simply replaces the Pro's stock gear mount. The new piece trims some fat from the HPI part and brings the spur gear 8 millimeters closer to the motor plate; that's a lot. Any pinion type may be used, and any run-out in the motor shaft (or the car's layshaft, for that matter) is minimized. That's all there is to it. The Robinson spur-gear adapter quietly does its thing without calling attention to itself. It's a great hop-up for the RS4 Pro (or any other RS4 series car without a slipper clutch).

—Peter Vieira

*Addresses are listed alphabetically in the Index of Manufacturers on page 241. ■

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2wd Mod	Freq. 1) _____	2) _____	3) _____	Truck Mod	Freq. 1) _____	2) _____	3) _____

Doors open at 7:00AM on Sat & Sun. Racing Begins at 9:00AM. Trophies 1 - 10 for all "A" Mains, 1 - 3 For all other Mains. Make checks payable to Long Island Raceway. For more information (including Hotel information) contact Long Island Raceway and Hobby at (516)845-RACE, 168 Broadhollow Rd., Farmingdale NY 11735. Please check out our web site at www.raceway.com. Limit 300 Entries. ROAR membership is not required however, all rules apply.

Perform Essential Soldering Tasks

Heat up your building skills by Peter Vieira

MOST ENTRY-LEVEL kits include motors and mechanical speed controls that can be assembled and operated without soldering, but only the most casual hobbyists would stick with these systems for very long. To exploit the benefits of aftermarket motors, high-performance batteries and more efficient battery connectors, you'll need to learn how to use a soldering iron. There are four basic soldering tasks that every R/C buff should know how to perform; we'll cover them all.



The basics—a good iron, 60/40 solder, flux and a “third hand.”

- **Motor capacitor installation.** Skip the caps, and you're sure to have radio glitch problems. There's no way to plug capacitors into the motor; you have to solder them on.
- **Battery assembly.** Once you've moved up to building your own packs from loose cells, you'll need to solder them together with battery bars.
- **Motor “hard wiring.”** A direct link between the speed control and motor is most efficient and looks neater, since you use only as much wire as is needed to reach the motor.
- **Aftermarket connector installation.** Deans* and Sermos* (“red and black”) connectors are the most popular varieties. These plugs are called “zero-loss” connectors because their electrical resistance is as low as or lower than the equivalent length of wire they replace. By comparison, the crimped-on, JST-type connectors supplied with most stick packs have relatively high resistance; that's why they may get hot or even melt when you use a powerful modified motor in your car.

CHOOSING A SOLDERING IRON

Buy the best pencil-type soldering iron you can afford. Ungar* irons are perennial favorites among R/C'ers, thanks to their quick warm-up, even heating and long-lasting tips. If you must settle for an inexpensive iron, buy a reputable brand such as Weller* or Craftsman, and make sure the iron is rated for at least 40 watts; anything less won't perform battery assembly or hardwiring jobs well. If your iron is not equipped with a spring-type stand, purchase one separately. Avoid gun-type irons; although acceptable for heavy jobs such as pack assembly, guns tend to be too clumsy for most R/C work.

SAFETY FIRST!

Always wear eye protection when you're soldering, and *always* work over the bench top—not over your lap. Avoid breathing solder fumes, and never leave a hot iron unattended. To prevent accidents, keep loose cords away from children and pets, and keep all objects (especially paints and aerosol cans) away from the iron.

PREPARING TO SOLDER

For electronics work, use 60/40 rosin-core solder (60 percent tin, 40 percent lead). Don't use acid-core solder! Before you start any soldering job, allow sufficient time for the iron to fully heat, then clean the tip by dragging it across a wet sponge. If the tip isn't shiny silver after you've cleaned, re-tin the tip (melt a bead of solder onto it, allow it to stand for a minute, then wipe the tip on the sponge).

That takes care of the iron; the items you wish to solder also need to be prepped. Make sure that their surfaces are clean. To ensure an even application of solder, brush a little flux (a paste or fluid that helps solder to flow and to bond more effectively with metal) onto the areas to be joined. Many hobbyists skip this step, but it's an important one if you want strong, electrically efficient joints. “Tin” the parts by applying a thin coat of solder to the surfaces before joining. When the parts are heated, the solder will flow between them more easily.

"TINNING" PARTS

1. Apply flux.

2. Heat the part with the iron's tip, then apply solder to the part, not the tip.

3. Distribute the solder evenly with the tip of the iron, and let it cool.

SOLDERING CAPACITORS

Check the instructions that came with your kit, ESC, or motor to determine which types of capacitors you need. Virtually all ESCs come with capacitors, but if you're completely in the dark, two or three 0.1-microfarad capacitors are the usual requirement.

1. If you're working with a stock motor, file off any paint or plating on the can between the solder tabs so you can solder the caps to the can. (You may skip this step if you are working with a modified motor; simply solder the caps to the third, center tab.)

2. Tin the filed spot (or third tab) on the can.

3. Bend the leads to fit the tabs as shown, and solder the cap into place.

4. Re-melt the solder on the can to submerge the caps' leads into the solder.

5. Some ESCs call for a third capacitor to be placed between the solder tabs; check the instructions. Once all the caps are in place, cut the excess wire.

BATTERY BUILDING

These steps show how to properly assemble battery bars and cells. Different kits call for different battery configurations; check your instruction manual.

1. It can be very difficult to get solder to flow properly on to the battery cells without preparing the surface. Roughen the metal ends of the cells with a small piece of 100- to 150-grit sandpaper or a fine file. Just scuff the cells enough to take the shine off.

Tin the battery bars and cells before you begin, and don't forget to use flux. If your soldering iron has adjustable temperature, crank it up so you can work more quickly. The less time the iron spends on each cell, the better; you don't want to heat the cells. There's no substitute for a good battery jig; this one is from Trinity*. Trinity, Orion and Xipp all offer solid units.

2. Use a pair of pliers to hold the battery bar in place, then press the tip of the iron to the bar. When you see the solder on the cell and bar flow together, remove the iron and allow the joint to solidify. You should not need to add additional solder.

3. Now solder the opposite end of the bar and repeat for the rest of the pack. Once fully assembled, check for "cold" joints by gently flexing the pack; any bad joints will pop loose. "Cold" joints occur when the solder does not flow through the parts, or insufficient heat is used to make the joint.

MOTOR HARD WIRING

1. Preparation is everything. Tin the motor's solder tabs before you begin.

2. Strip about 1/4 inch from the end of the wire you wish to solder, and twist the wire tightly so no loose strands stick out.

3. Apply flux and tin the end of the wire. The wire will "wick" the solder into itself. Saturate the wire, but don't overdo it, or the solder will flow beneath the insulation and make the wire inflexible.

4. Use pliers or a heat sink (this one is from Niftech*) to hold the wire while you solder. Just press the iron to the wire and tab until the solder on both parts flows together. If the parts don't want to join, melt a blob of solder onto the tip of the iron before you touch it to the parts to be joined. The blob will flow over the parts and liquefy the solder.



Never snip both battery leads simultaneously!

INSTALLING AFTERMARKET CONNECTORS

Note: before removing the factory connector from a battery pack, be sure it is fully discharged. To avoid shorting the pack, cut and solder one lead before working on the other.

DEANS PLUGS

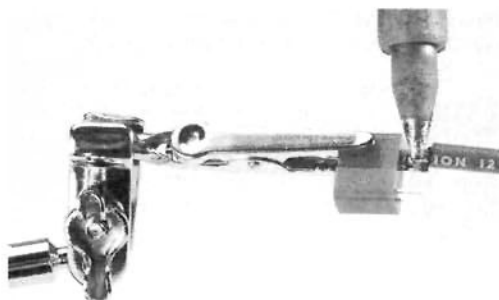
1. Using flux, tin the plug's solder tabs. A "third hand" helps immensely. This is Radio Shack's no. 64-2063



2. Strip an 1/8 inch of insulation from the battery or ESC lead, and tin as previously described. Slip a bit of heat-shrink tubing over the lead so you can insulate the joint later. Slide the tubing as far away as possible from the joint area so the heat from the soldering iron does not prematurely shrink it.



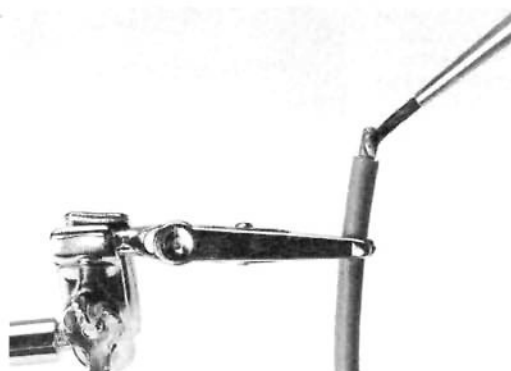
3. Press the wire to the connector with the soldering iron's tip. Work quickly, or you'll melt the plug's plastic jacket—if the wire and connector don't join in a second or two, remove the iron! Give the plug a minute to cool, then try again with the "blob" technique.



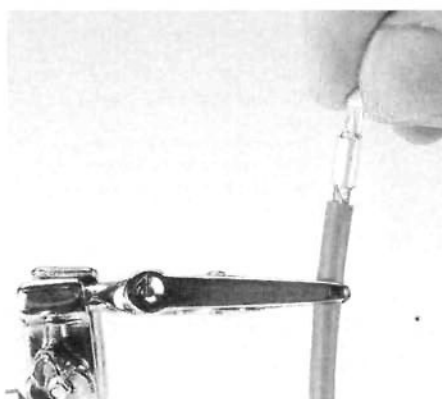
4. Shrink the tubing over the solder joints. Some hobbyists skip this step, since it is virtually impossible for the joints to touch each other. However, a screwdriver or similar tool can bridge the exposed tabs and short the pack—not pretty. Be safe; use the heat-shrink tubing.

SERMOS CONNECTORS

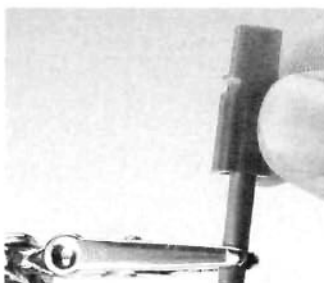
1. If you're using 14- or 16-gauge wire (the size is usually printed on the insulation), strip and tin as described previously. For 12-gauge wire, you will have to skip the tinning; the wire is too large to fit into the connector once tinned. Don't skimp on the flux, though.



2. Use the third hand to hold the prepped wire straight up, then slip the connector over the wire.



3. Heat the connector as shown, and apply solder through the opening in the top. When solder bleeds through the seam, remove the iron and allow to cool (you'll need to use more solder if you're using un-tinned wire). Once cool, check for a "cold" joint by tugging on the connector; re-heat if necessary.



4. Snap the plastic hood over the connector, and repeat the process for the other lead.



WAS THAT SO BAD?

It shouldn't have been! As long as you keep your soldering iron clean, always wait until it has fully heated before starting a job and have a little patience, you'll

do just fine. Don't forget to wear eye protection and always triple-check to make sure that the iron is off when it's time to turn out the lights in the workshop. I almost forgot—congratulations! Once

you've mastered soldering, you are officially relieved of "beginner" status. Welcome to the big leagues!

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Kyosho/Great Planes Model
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Losi
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Matrix
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Mugen Seiki
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RPM Inc.
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Team Associated
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Tenth Technology
Shornebury Pear Tree Lane, Shorne, Kent, England, U.K., DA123JX; (047) 482-4444.

Thunder Tiger USA
116 W. 19th St., P.O. Box 472, Higginsville, MO 64037; (816) 584-7121; fax (816) 584-7776.

TOP
see NovaRossi.

Traxxas Corp.
12150 Shiloh Rd., #120, Dallas, TX 75228; (972) 613-3300; fax (972) 613-3599; website: www.traxxas.com.

Trinity Products Inc.
36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; fax (732) 635-1640; website: www.teamtrinity.com.

Ungar
distributed by Horizon Hobby Distributors (address above).

Weller/Cooper Tools
P.O. Box 728, Apex, NC 27502.

Yokomo USA
Airport Business Center, 17951 Skypark Cir., Ste. K, Irvine, CA 92614; (714) 252-8663; fax (714) 252-8657; website: www.yokomousa.com.

Zenoah
distributed by ISC Intl., 10620 N. College Ave., Indianapolis, IN 46280; (317) 844-1978.

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Chris's BACK LOT

The opinions expressed on this page do not necessarily represent the opinions of the entire Car Action staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. My email address is: chrisc@airage.com.

BY CHRIS CHIANELLI

RC10GT and Thunder Tiger power

The perfect off-road gift combo—in my humble opinion, of course: the Associated RC10 GT with the Thunder Tiger Pro .12, which was designed for it. With this one, you have off-road, nitro and trucks covered—an awesome gift.



Hot cocoa with Cameron Christmas Eve can be chilly.

Demand an R/C Xmas

You know, fruit cake doesn't start out as hard as a rock; It's just that the stuff is so disgusting that when we're given it, we quickly stuff it back into its sissy decorator tin and re-wrap it for a relative we hate—who does the same, and so on. I once tossed one of the horrid things out onto the front lawn, and even the chickadees spit it back out!

Anyway, instead of fruit cake baked in 1958, here's what I want for Christmas.

Run off some copies of this page and hand them out to your relatives. Maybe they'll get the hint. If they don't, it's FRUIT CAKE FOR THEM next year!!

Hardened-steel stocking stuffers

How about a set of Dynamite's Pro Hex Drivers or Pro Nut Drivers? Better yet: how about both?! You and I both know that some really useless junk gets stuffed into those stockings. Thank the angels and ministers of grace they can't jam a fruit cake in there! I hope some annoying prissy "nick-knack" company doesn't start making mini fruit cakes.



JR XR2

A lot of gift for the money JR XR2. Not only do I personally really like this easy-to-operate computer radio, but the price is so right that you stand a great chance of getting it, even if your family members tend to be cheapos.

Hula holiday

Two airline tickets to the next Kyosho World Cup. Oh, yes; this one is being held in Hawaii.



For the on-road elf

This combo is guaranteed to put a huge smile on the face of any on-road elf: Tamiya's GTX Mk. I TS and the awesome O.S. LD engine. I know this elf is smiling.



Make a statement

Lucas Racing's 1/5-scale Porsche 911 is a finely machined piece of miniature automotive work—a true "gem," as it were. If you find this beauty under the tree, it's her way of saying she'd marry you all over again!

R/C Assault

I know Christmas still brings out the "boy" in me. What could be more fun than Hobbico's M1 Abrams tank and Power Patrol wheelie jeep. They're fully assembled and to "bug out" R/C style, of course.

